THE

AGRICULTURAL BULLETIN

OF THE

FEDERATED MALAY STATES.

No. 1.] JANUARY & FEBRUARY, 1919. [Vol. VII.

METHODS AND MACHINERY FOR THE EXTRACTION OF OIL FROM SEEDS, ETC.

By B. J. Eaton.

OWING to the number of enquiries received recently for methods and types of machinery for the extraction or expression of oils from seeds, it is considered desirable to supply as much information as possible on this subject.

This article deals entirely with methods of extraction of what are known as fixed vegetable oils or fats, which are all derived from seeds of various kinds and does not treat of what are known as essential or volatile oils which are usually obtained by distillation, enfleurage or extraction by solvents from the flowers, leaves, stems or roots and occasionally seeds of plants. The fixed oils or fats are so-called, because they are not usually volatile in steam and cannot therefore be obtained by a steam distillation process. They are used for a variety of purposes, chief among which are their use for edible purposes, principally as a substitute for butter fat, for the manufacture of soaps and candles, for lubrication purposes in machinery of all kinds, and for the manufacture of paints and varnishes. The volatile or essential oils are used directly or indirectly as the basis of all scents, flavouring matters, essences, etc.

The chief representatives of vegetable edible fats are coconut oil and palm kernel oil, although cotton seed oil is also used extensively as is ground-nut or earth-nut oil.

Other vegetable oils are used to a lesser extent for adulteration purposes. Olive oil is also used largely as a salad oil and cotton seed oil is also used for the same purpose. First quality cold expressed castor oil is also used medicinally. Many fats and oils are used for soap and candle-making, in fact most of those from which the solid fatty acids are obtained in quantity and which cannot be used for various reasons for edible purposes. Castor oil, particularly the darker coloured oil, is used extensively for lubricating purposes, especially in tropical countries for heavy machinery—locomotives, etc. It is generally too viscous for similar

use in cold and temperate climates. The development of the aeroplane industry, due to the present war, has increased enormously the demand for this oil, especially for a certain type of aeroplane engine. If this development is continued for commercial purposes the demand for castor oil is likely to be maintained.

The principal vegetable oil used for paint and varnish making is linseed oil the value of which lies in the fact that it can absorb oxygen from the air and forms by so doing a varnish-like film, being classed on this account as a drying oil. As is now generally known, rubber seed oil is also in this class although not as efficient a drying oil as linseed.

Practically all seeds contain more or less oil or fat but only seeds containing a comparatively large percentage are of value commercially as oil seeds.

A number of seeds from wild or forest plants and trees also contain valuable oils, *e.g.*, the tree which yields Borneo tallow, Shea Butter, Tengkawang and Illipé fat (*Shorea* sp., *Hopea*, etc., *vide Agricultural Bulletin*, Vol. I, No. 4 of November, 1913,) which however are not of great commercial value owing to the irregularity in fruiting. It is possible that some of those in our Malayan forests might be worth cultivation as a source of oil, *e.g.*, *Carapa Moluccana* and *Kapayang* (*Hodgsonia heteroclita*?).

The fixed oil or fat is extracted from seeds by one of two methods (*a*) expression (*b*) extraction with solvents.

Since it is not intended to discuss in detail the latter process, it will be briefly described first.

Extraction Process by the Aid of Volatile Solvents.

In the extraction of oil or fat from seeds by means of volatile solvents, the seed is crushed to a fine meal and placed in special extraction apparatus connected to the vessel containing the solvent. The solvent is boiled and made to distil into the vessel containing the seed meal. After the solvent has permeated the meal and dissolved a portion of the oil or fat, on reaching a level just above that of the surface of the meal, it is automatically syphoned back into the vessel containing the solvent. The process of boiling the solvent and causing it to distil and condense in the vessel containing the meal and then to syphon back into the vessel containing the solvent is continued until the solvent has extracted all the oil or fat from the meal.

The number of extractions required and the time taken depend chiefly on the character of the seed and the fineness of the meal into which the seed is ground. By tapping off the solvent from the meal container at intervals, tests can quickly be made to ascertain whether the oil or fat has been extracted thoroughly.

The solvent containing the oil or fat is then distilled off, leaving the pure fat or oil behind and the solvent can be used again for further extraction purposes.

The last traces of solvent are very difficult to remove from the oil or fat, which has to be purified by blowing air or some inert gas, *e.g.*, carbon dioxide, through the heated fat.

It is said that the extraction process for separating oil or fat from seeds is becoming employed more extensively during recent years and that for many purposes the extraction method has advantages over the expression process.

Its value compared with the expression process depends on the fact that practically all the oil or fat can be removed from the seed, whereas by the highest hydraulic pressure, usually about 6 to 8 per cent. of oil is left in the oil cake or residual meal, representing a loss of about 3 to 4 per cent. on the original seed or 6 to 8 per cent. of the total oil content in the case of a seed containing say 50 per cent. of oil or fat.

Although the yield of oil is higher by the extraction process, the residual cake is of less value for cattle feeding, etc., since it contains little or no oil.

Further, seed which has been extracted by means of solvents is often not of any use for feeding purposes, owing to its non-palatability, due to traces of the solvent, which are difficult to remove. Such cake is very suitable for fertilizing purposes, but its monetary value is less for such a purpose than as a cattle-food.

In other respects, the comparative value of the extraction and expression processes depends largely on the loss of the volatile solvent in the former. With efficient condensation and distillation apparatus, the amount of solvent lost is small.

The solvents largely employed are carbon bisulphide, carbon tetrachloride and trichlorethylene. Any very volatile solvent of oils or fats may be used, and the liquid employed depends largely on cost.

Owing to the relatively high temperature in this country, it is probable that an extraction process would not compare favourably with an expression process, on account of unavoidable losses of solvent due to the difficulty of efficient condensation in the recovery of the solvent.

In some cases, *e.g.*, in the preparation of castor oil, both the extraction and expression processes are combined, the latter being employed first in order to obtain a high class medicinal oil by cold pressing of the seed, followed by chemical extraction to remove the remaining oil. This combination, however, is not carried out in all factories in which castor oil is manufactured.

Process of Preparation of Oil from Seeds by Expression.

The expression process for the extraction of oils from seeds is very ancient; the wedge press and the large wooden pestle and mortar in which the pestle is rotated usually by bullock-power are well-known in the East.

These crude processes, however, are not efficient or economical, owing to the comparatively low pressure which is obtained and can only be used where labour is cheap. The ordinary bullock-driven pestle and mortar press leaves about 15 per cent. or more oil in the residual cake compared to about 6 per cent. in the most efficient modern hydraulic presses.

In modern oil-pressing factories the pressing system has resolved itself into two—the Plate (Anglo-American) system and the Cage system. The expeller system, as represented by the Anderson oil expeller, is a more recent development and will be discussed later.

In the case of both systems, the preliminary treatment of the oil-bearing material is similar, apart from different treatment in respect of decorticating or removal of shells or husks, which must vary of necessity with different types of seed.

It is not intended here to discuss the special methods which have to be employed to remove the shell from such different seeds as say the coconut, palm nut, castor seed, etc., since this would necessitate a description of details of many special machines, but to describe only such machines as are employed generally after the seed has been decorticated, or before, in such cases where the whole seed may be treated.

In the case of seed from a plantation, *e.g.*, castor seed, para rubber seed, coconuts, etc., preliminary screening to remove impurities, is not usually required. By decorticating, however, twice the amount of seed can be treated in a given time compared with undecorticated, in the case of a seed containing 50 per cent. of shell or husk, since the shell or husk rarely contains oil.

Disintegrators.—The first operation, which can be dispensed with in many cases, is to break up the seed into small pieces or into a coarse meal, which is carried out in a machine known as a disintegrator. A number of different types of machines are used, but a common type consists of revolving grooved discs between which the seed is drawn and broken up by the discs, one of which may be stationary or both moving in opposite directions. Another type consists of rollers with blunt knives. Copra is a well-known example of a seed which requires treatment in a disintegrator in order to break it down into small pieces before passing to the crushing rolls.

Crushing rolls.—The next operation, after disintegrating, is to pass the coarse meal or small seeds, whole or decorticated, through crushing rolls where the seed is ground or pulverised to a fine meal. This operation is of importance since the fineness of the meal and the breaking up of the oil cells has an important effect on the efficiency of the subsequent expression of the oil. The seed must also be of a suitable dryness before passing between the rolls of the machine, otherwise "spueing" takes place and clogging. The machine consists usually of a set of five superimposed rolls, the top roll being corrugated or grooved horizontally, A small horizontally-grooved feeding roller is also attached to feed the meal on to this top roll. A hopper is attached to the top of the machine to receive the meal. In all large factories the disintegrated seed is fed on to the crushing rolls by means of a conveyor or chute, and the crushed meal from the bottom roll falls into a pit or chamber from which it is again removed by means of suitable conveyors to the steam kettle

(NOTE.—In the case of cold pressing of seed, *e.g.*, of castor seed, in order to obtain the highest quality medicinal oil, the seed is not crushed but taken whole to a "Cage" press. The residual meal from the once cold pressed seed is, however, after removal from the presses, passed through crushing rolls.)

Steam kettle.—The next process, unless a cold pressed or cold-drawn oil is required, is to convey the crushed meal to a " steam-kettle " which consists of a large open cylindrical steam-jacketed pan, provided with a damping arrangement by means of which steam can also be passed direct into the meal in the kettle in order to moisten it sufficiently. The kettle is also provided with a stirring arrangement to keep the meal thoroughly mixed. Crushed meal is continuously being fed into the kettle from the crushing rolls and removed for the presses. The temperature to which the crushed meal is raised in the steam kettle depends on the seed and the nature of its oil content. Usually, however, the temperature is in the neighbourhood of 130° to 140° Fah. The heating or "tempering" of the crushed meal is obviously to render the oil content of the seed more readily extractable, by increasing the fluidity of the oil and by breaking up the oil cells in the seed and also by coagulating some of the protein or albuminous matter, which would otherwise pass into the expressed oil.

Cake moulder or forming machine.—In the case of the open plate or Anglo-American presses, the heated meal from the steam kettle has next to be passed to a cake moulding machine in which it undergoes a preliminary pressing, sufficient to compress the meal into a cake or compressed mass which can be handled, but not sufficient to remove any oil. A box open at the top and bottom, which holds sufficient meal to form one cake, is placed beneath an opening in the steam kettle, which is closed by means of a small door. This box rests on a slide which forms the bottom and which runs from the steam kettle to the cake moulding machine, which is always placed next the kettle. Beneath a rectangular opening in this slide attached to the cake moulding machine is placed a steel tray covered with the cloth in which the cakes are contained for pressing. The cloth is more than twice the length of the cake so that it can be wrapped round the meal longitudinally leaving only the long sides of the cake open.

The open box of meal is pushed by hand until it reaches the opening in the slide above the tray, into which the contents are dropped.

The cloth which overhangs the tray at each end is wrapped or lapped over the rectangular shape of meal and the tray holding the meal is slid on to the table on the ram of the cake moulding machine, actuating a lever which allows steam to force up the ram automatically and presses the cake against the top of the cake moulding machine.

The lever is then actuated by hand and the ram drops, allowing the operator to remove the tray and compressed meal which is then taken to the open plate press. The compressed cake is placed on a plate in the press, and the tray removed by sliding it from under the cake. The operation of producing cakes in the cake moulding machine is repeated until the press, which usually holds 16 to 18 cakes, is filled, when the press is raised as described below. In order to render the operation continuous, one cake-moulding machine usually supplies four presses, so that while one press is under pressure, the others can be filled and emptied.

NOTE.—In the case of the Cage press the cake moulding machine can be dispensed with, since the meal is enclosed in a cylindrical cage, and formed into a cake in the press itself.

Anglo-American Presses.—The Anglo-American or plate press consists of a series of superimposed strong steel plates separated from each other by suitable means and resting on a powerful ram. The ram is raised by means of hydraulic oil pumps and accumulators and the plates between which the cakes of meal are placed, are raised and pressed against the top of the press. The cakes are thus pressed and the oil commences to flow at first slowly and subsequently more rapidly from the sides of the plate and is caught in a tray beneath the press plates and from thence can be led into a suitable chamber or pit beneath the press.

The press is slowly raised to the maximum pressure, which in the most powerful presses rises to 2—3 tons per square inch, and left at this pressure for a period of 5 to 15 minutes, until the oil ceases to flow. The pressure is then removed and the ram drops, enabling the cakes to be removed by hand.

As the expressed cakes are removed, fresh cakes are placed in the press till again filled and the operation repeated. By means of suitable distribution valves, each press in a battery can be placed under pressure and released independently, enabling the operation to be continuous. Pressure on the ram is obtained from hydraulic oil pumps worked by means of an engine or motor.

It should be stated here that the press plates are corrugated or grooved on each side in order to allow the oil to flow away more readily. They are also concave on each side in order to prevent the meal from being squeezed out, except in small quantities. This corrugation of the plates gives the well-known corrugated appearance to all oil cakes. In the Anglo-American or plate presses the edges of the cake always retain a fair proportion of oil, owing to spueing of the cake at the edges of the plates. The cakes are therefore removed to a cake-paring machine, in which the edges are pared off and the parings again passed through the crushing rolls and the steam kettle.

The pared cakes can then be stacked in suitable racks to enable them to cool down before storage.

All seeds requiring a single pressing are usually treated in these presses. Many seeds require twice pressing, especially those in which the first pressing, for special reasons, is carried out on cold pressed meal.

Copra and other seeds containing a high percentage of oil are almost invariably pressed twice, both pressings being on heated meal.

Cage Presses.—In some oil mills, cage presses are used exclusively. As stated above, in the case of the cage press, which is an enclosed press, the cake moulding press can be dispensed with, since the cakes are made direct by pressure in the press. These presses are often built under the steam kettle. The ram is raised nearly to the top of the press and a definite amount of heated meal from the steam kettle regulated by a chamber beneath is dropped on to a press plate on top of the ram, the press plate being covered with a mat or cloth. Another cloth and press plate is then dropped on to the meal and a further cloth and then more meal, so that each lot of meal is placed between two press cloths and two steel plates. The ram is slowly lowered at a rate corresponding with the rate of feeding in the meal.

When the press has been filled in this manner a massive slide is moved over the top of the press and the ram is raised. The oil is squeezed out through the sides of the press, which consists of a perforated cylinder or more usually a series of stout steel bars, while the cake is retained. In order to prevent squirting of the oil, these presses are usually surrounded with a thin galvanized cylindrical sheet of metal. The oil flows into a tray beneath the press.

It is generally intended that the cakes from these presses should be again reduced to meal and repressed in other cage presses or in an Anglo-American press.

It is, I believe, the general opinion that the Anglo-American presses can be subjected to a considerably higher pressure than the cage presses since the pressure capacity of the latter depends on the strength of the steel bar cylinder or cage. In this country, however, we have mills for the manufacture of coconut oil from copra working entirely with Anglo-American presses and others with cage presses only. One mill, with only Anglo-American presses carries out only one hot expression while another with cage presses carries out two hot pressings.

One manufacturer of oil machinery also states that the Anglo-American or open plate presses are not satisfactory for seeds yielding more than 35 per cent. of oil at first pressing. This, however, is not borne out by practice.

It may be stated here, that the advantage of a second pressing, where the first has been fairly efficient, depends largely on the capacity of the mill and the price of oil. If the capacity of the mill is small and the price of oil high, it would be more profitable to carry out only one pressing.

Usually the cage press is of a circular type and produces a round oil cake but square presses are now made.

In some cage presses, used for the manufacture of castor seed oil, in which whole seed is fed into the steam kettle and raised to a temperature of only 90° Fah. (this is obviously in a temperate climate) with a first cold pressing and with a pressure of three tons per square inch on the ram, the amount of oil left in the cake has amounted to less than 10 per cent. Four of such presses can be operated by two men, each press having a capacity of 5 cwts. of seed per pressing or a total of two tons per hour for the four presses, with two pressings, or three tons with three pressings per hour. The ordinary rate of working is from four to six presses per hour.

One advantage of the cage press is the saving in the expensive press cloths or mats, which probably amounts to over 50 per cent. compared to the plate or Anglo-American press.

One oil machinery firm gives the following list of seeds as suitable for pressing in Anglo-American presses—linseed, cotton, soya beans, ravison rape, mustard, sunflower and similar seeds. This firm states that the Anglo-American system is adopted in all modern mills for the above seeds and gives the best results in respect to economy of labour and maximum oil expression.

The following seeds—palm kernel, copra, castor, gingelly, ground-nuts, poppy and East Indian rape seed or seeds which require twice pressing are said to be more suitable for treatment in cage presses for a first pressing, followed by the Anglo-American press for second pressing.

Cake paring machine.—A cake-paring machine is required only with the Anglo-American or open plate hydraulic press, in order to cut or pare away the edges of the cakes which contain a fair proportion of oil. It is not necessary here to describe this machine in detail.

Hydraulic pumps and accumulators.—To supply the necessary pressure to the hydraulic presses whether of the Anglo-American or cage type, hydraulic oil pumps driven by a motor or engine are required. In the case of large installations accumulators are recommended by oil machinery manufacturers, as giving a more steady even pressure, and being less liable to give an undue excess of pressure through the locking of safety valves common to hydraulic pumps. The accumulators act as safety valves to the hydraulic pumps which supply the necessary pressure.

Press cloths.—Press cloths are essential in the Anglo-American or open plate press for enclosing the cake. These cloths are very expensive and require renewal fairly frequently owing to bursting by the pressure in the hydraulic presses. They are usually made of camel hair and apparently few suitable and more economical substitutes have been found. In the cage press, they are usually employed between the plates, but can be dispensed with. In any case they lie flat on the press plates and are therefore not subjected to any pressure at the edges as in the open presses where they are folded round the cake.

Filter presses.—In order to avoid the use of large settling or subsidence tanks, all modern oil mills are equipped with filter presses, in order to filter and clarify the oil from "foots" almost immediately after the oil is pressed from the seed and thus render it suitable immediately for marketing. Storage tanks are then required only for the filtered oil. The "foots" can be returned quickly to the steam kettle and presses to remove any oil retained. Special filtering cloths are required in these filters, which work under pressure.

One oil machinery firm states that a filter with 45 plates, each 32 inches square will filter about 150 tons of crude oil, before it is necessary to remove the filter cloths. These cloths can then be removed, cleaned and used again several times. The oil is forced through the filter by means of special pumps.

Fats which are solid at ordinary temperature obviously require heating to render them fluid before filtration.

Oil pumps.—Rotary or other type of suitable pumps are required to pump the oil from chambers or pits beneath the hydraulic presses or filter presses to suitable storage tanks.

Conveyors.—In order to minimise the amount of handling, special conveyors consisting of worm shafts, bucket conveyors and chutes are necessary for conveying the seed from the disintegrators to the crushing rolls and thence to the steam kettle.

Engine or Motor.—A suitable engine or motor is required to drive the disintegrators, crushing rolls, hydraulic pumps and stirring gear in the steam kettle.

Boiler.—A suitable vertical boiler is required to supply the necessary steam to the steam kettle and for actuating the ram in the cake-moulding machine.

Transport of oil to markets.—Hitherto most oils manufactured in the tropics have been transported in tins, barrels or other containers. Formerly, all the coconut oil manufactured locally was shipped in the well-known kerosene tins packed in pairs in wooden boxes. These being now unobtainable in quantity, barrel packing has been adopted.

The writer, however, is of opinion that the most satisfactory method of export is by means of tank steamers, using either bilge tanks or steamers with specially constructed tanks for the purpose. It appears probable that this system will be adopted in the future. It is said to be already in use in the Philippines for the export of coconut oil to America. In the case of oils which solidify in a cold climate, *e.g.*, coconut oil, it will be necessary to heat the tanks before arriving in port, in order to be able to pump the oil into receiving vessels. This, however, presents no special difficulties.

The above is a detailed outline of the machinery necessary for the manufacture of oil from all oil seeds by the hydraulic press system, which is at present almost the universal system throughout the world in modern factories. The names of well-known manufacturers of hydraulic oil-pressing machinery are given at the end of this article.

The Anderson Expeller.

A comparatively new machine which differs from the hydraulic press system has been in use for some years in America, especially for the expression of cotton seed oil. This machine is known as the Anderson oil expeller and is manufactured only by the V. D. Anderson Co. of Cleveland, Ohio, U.S.A. A machine working under the auspices of the Agricultural Department in St. Vincent, W. Indies, has also given good results with cotton seed, expressed on behalf of small-holders by the Agricultural Department. Information published by the Agricultural Department of St. Vincent led the writer to make enquiries concerning this machine and it was ascertained that during the last few years, a large number had been imported into the Philippines for expressing coconut oil from copra (*Vide* paper "Coconut Products in the Philippines" by Mr. W. S. Cookson in *The Agricultural Bulletin*, Vol. VI, No. 11, September and October, 1918.)

Further enquiries elicited the fact that an old machine was actually working in Singapore and the writer has twice visited the small factory run by Chinese, in which this machine was found expressing oil at different times from ground-nuts, gingelly and Illipé seeds.

Tests carried out by the writer on the residual cake from this machine also showed its efficiency in expression, although it was not possible to spend a sufficient time in the factory to ascertain its capacity and output. (*Vide* article on "The Efficiency of the Anderson Oil Expeller" contained in this issue.)

Information, however, since received from the makers shows that the capacity of the machine is very satisfactory and from the information available it would appear to be very suitable for use in the tropics, more especially, for the softer variety of oil seeds, although it appears to be giving satisfactory results also with copra in the Philippines.

If worked according to its maximum economical capacity, however, the amount of coconut oil expressed from copra is somewhat less than that obtained in hydraulic presses. If worked to obtain the maximum amount of oil, the capacity or output is said to be rather low.

According to Mr. Cookson who visited the Philippines early in 1918 there are nearly 200 of these machines treating copra in the Philippines and the demand has been such that machines have fetched seven and eight times their actual cost from the makers.

According to information contained in a recent number of the West Indian *Agricultural News*, this machine is also working satisfactorily on castor seed in Mysore, extracting as much as 44.3 per cent. of oil from seed containing 47.2 per cent., yielding a cake containing only 5.05 per cent. of oil.

Description of machine.—The expeller consists essentially of a horizontal cylindrical press, with sides constructed of steel bars, similar to the cage press. Pressure, however, is obtained by means of a screw working against a cone-shaped opening at one end of the machine. The screw carries along the crushed meal which is pressed against the sides and end of the machine and the cake is ejected in irregular pieces from the end of the machine. The meal is fed in through a hopper and the machine works continuously and automatically. A tempering apparatus consisting of a steam-heated trough is attached if necessary for heating the meal to the necessary temperature—the meal passes along this trough continuously. This tempering apparatus is evidently efficient, since Illipé fat is solid at ordinary shade temperature in this country (85° Fah.).

The necessary accessories consist of a motor or engine to turn the screw and to drive crushing rolls. The expeller itself requires about 15 h.p.

It is stated that the seed need not be crushed as finely as for hydraulic presses. In the factory visited by the writer a set of small crushing rolls was in use, for grinding the seed. Filter presses, storage tanks, etc., are obviously required for the oil and also a boiler to provide steam for the tempering apparatus, unless a steam engine is used for motive purposes, and it would be advisable to have a press, in a large factory, to convert the irregular lumps of oil cake into a solid circular or square cake for purposes of export.

Since the expeller works automatically, very little labour is necessary and, provided the machine is in proper working order, very little expert supervision is required.

The following details of the cost of the machine with accessories, were obtained from an annual report of the Department of Agriculture, St. Vincent.

Expeller with "foots" elevator and "tempering" apparatus	£500.0.0
Crude oil engine 30 h.p.	300.0.0
Huller to grind seed	26.0.0
Shafting, pulleys, conveyors, belting, etc.	60.0.0
	£886.0.0
Add 20 per cent. freight	177.0.0
Cost of erection of machinery, buildings, oil tanks, etc.	500.0.0
Total ...	£1,563.0.0

The price of the machine, as quoted by the makers at the end of 1918 was as follows:

Cost of Expeller plus tempering apparatus ...	$3,525 gold.
„ „ Box packing, etc.	75 „
Cost of Expeller plus tempering apparatus plus motor...	$4,150 gold.
„ „ Box packing, etc.	90 „

This machine should be capable of treating about $\frac{1}{4}$ ton of seed per hour. From the above information, the number of expellers required to treat any given quantity of seed can be ascertained, together with the necessary power required. It may be stated that large seed crushing rolls will probably require about 10-12 h.p.

The advantages of this machine are its automatic and continuous treatment of the meal, minimising handling, and its low initial cost.

Hydraulic Oil Machinery Manufacturers.

Two of the best known oil machinery firms in England are the well-known and old-established firm of Messrs. Rose, Downs and Thompson of Hull and Messrs. Greenwood and Batley of Leeds. The former firm was the originator of the Anglo-American press system in England.

A well-known American firm would appear to be the French Oil Machinery Co., Piqua, Ohio, U.S.A. No information is available as to oil machinery firms in France, except those referred to in a recent article on palm oil manufacture in the *Agricultural Bulletin*.

It is at the present time of little value to publish details of cost of machinery supplied by oil machinery manufacturers, since the present prices are, approximately, double those of normal times.

The following details, however, of estimated machinery requirements in the case of coconut oil mills may be of value and interest in this country.

Capacity 2 tons of copra per hour. (Approx.)=1.2 tons of oil per hour.

SCHEME (1).

1. Seed bin, capacity 30 tons copra.
2. Shaking distributor.
3. Two sets breaking rolls.
4. Four sets Anglo-rolls.
5. Two hydraulic compresser extractors with extraction gear for cakes.
6. Two steam kettles with strickling gear.
7. Eight hydraulic finishing cage presses.
8. Eleven perforated pressing boxes with press plates for above.
9. Two travelling carriages.
10. Two sets low and high pressure distribution boxes.
11. Eight sets patent automatic pressure distribution valves for finishing presses.
12. Two oil receiving and settling tanks.
13. Two sets oil collecting troughs.
14. Two drip tanks under presses.
15. Two rotary oil pumps.
16. One cake breaker.
17. Three sets hydraulic pressure pumps.
18. One exhaust oil tank and one pump suction tank.
19. One set of high and low pressure accumulators.
20. Three elevators.
21. One scraper conveyor and six screw conveyors.
22. Twenty cake racks on wheels.
23. Two thousand woollen press mats.
24. Two hydraulic filter presses.
25. 1,000 yards filter cloth.
26. Two duplex steam pumps for filter presses.
27. Four tanks. Two for crude oil and two for filtered oil.
28. Two rotary oil pumps for pumping filtered oil to oil store tanks.

SCHEME (1)—*cont.*

29. Two oil tanks.
30. One engine.
31. Two Lancashire boilers, 250 lbs. pressure. Working pressure: 150 lbs.
32. Piping, shafting, belting, etc.

SCHEME (2).

1. One attrition mill.
2. Two sets crushing rolls.
3. One steam-jacketed kettle.
4. One meal measuring and cake forming box.
5. One cage filling press.
6. One cage discharging press.
7. Four finishing presses.
8. Six movable pressing cages.
9. One travelling carriage.
10. Six sets press plates.
11. Six sets high and low pressure distribution valves.
12. One double cake breaker.
13. One cake trimmer.
14. Two power pumps.
15. One oil strainer tank (570 gallons).
16. One pair low and high pressure accumulators.
17. Two 150 h.-p. horizontal tubular boilers.
18. One engine.
19. Two oil storage tanks (each 5,000 gallons).
20. Feed pumps, feed water heaters, shafting, belting, etc.

SCHEME (3).

Similar to Schemes (1) and (2) but hydraulic presses to consist of four cage presses and eight Anglo-American or open plate presses for second pressing of meal. Complete accessory machinery for filtering, etc. and storage not quoted.

THE EFFICIENCY OF THE ANDERSON OIL EXPELLER.

By B. J. Eaton.

PARTICULARS of the Anderson oil expeller are contained in an article in this issue "Methods and Machinery for the Extraction of Oils from Seeds."

The efficiency of an old Anderson oil expeller which is said to have been running in Singapore for over ten years, under by no means ideal conditions, has been tested by me, by investigating the residual cake from various seeds with the following results:

	Oil (per cent).	Moisture (per cent).
Cake from ground-nuts ...	9.33 ...	13.61
Cake from small round seeds (Illipé ?) (1st expression) ...	31.48 ...	9.00
Cake from ditto after 2nd expression	16.76 ...	12.63
Cake from ground-nuts ...	11.2 ...	12.8
„ gingelly seed ...	11.2 ...	12.7
„ ground-nuts ...	6.9 ...	—
„ copra *	9.7 ...	11.6

The small round seeds (Illipé) are imported from Borneo and yield a hard solid fat at the shade temperature (85°Fah.) in Malaya. The fat is probably one of the oils classed as "Illipé" fat or Borneo tallow.

The whole kernels contained 54.32 per cent. of oil and 7.59 per cent. of moisture in one sample and 55.67 per cent. of oil and 6.91 per cent. of moisture in another sample. (The analysis of these samples was carried out by Mr. D. Coghill.)

A large, brown, flattened oval seed, also from a similar source and yielding a very similar fat, contained 51.41 per cent. of oil and 8.32 per cent. of moisture. No residual cake from these seeds after treatment in the Anderson expeller was available. (Analysis conducted by Mr. D. Coghill.)

The ground-nut cake and gingelly cake was derived from seed imported from India. The original ground-nuts contained 36.9 per cent. of oil.

These results indicate that the expeller in the case of the copra, ground-nuts and gingelly has a very good efficiency, although not quite as good as in the case of the most efficient hydraulic presses in which the oil in the residual cakes varies usually from about 6 to 8 per cent.

* The sample of poonac or cake from copra was a sample obtained from copra expressed in an Anderson expeller in Ceylon.

The lower efficiency in the case of the Illipé (?) seed is probably due to the nature of the fat and to the fact that the seed was not steamed to a sufficiently high temperature to render it fluid.

The results, in my opinion, indicate, from the point of view of efficient expression, that this machine would serve excellently for the purpose of oil expression in the case of the majority of seeds in the tropics, especially when its original cost and cheapness in running are taken into consideration.

For further details reference should be made to the preceding article on "Methods and Machinery for the Extraction of Oils from Seeds."

A MEMORANDUM ON RICE SUPPLIES.

By R. J. B. Clayton.

(*Deputy Food Controller, Penang.*)

1.—Rice Supplies Generally.

EVEN before the war the world's rice supply was somewhat precarious—the reason being that *except under special circumstances* the padi cultivator has little incentive to raise more rice than he can himself consume or find an immediate local sale for at a reasonable price.

Out of the 37 chief rice producing countries. all but 11 themselves consume more than they produce and of these 11, three (India, Siam and Indo-China) do three-fourths of the total export trade, so that the surplus available in the other eight is practically negligible.

Again, of a world production of about 60,000,000 tons only some 6,000,000 tons or 10 per cent. is available for export, so that a small increase in local consumption or decrease of production in these three countries would mean a great shortage in the countries dependent on imported rice. India producing over 30,000,000 tons or about half the world's supply consumes 93 per cent. of its own production and has only about 7 per cent. available for export. Siam producing rather under 3,000,000 tons exports one-third of its production but the crop fluctuates considerably and the supply is uncertain; Indo-China producing between 3 and 4 million tons exports in a good season about one-quarter of her crop.

Of this $4\frac{1}{2}$ million tons Malaya as a whole normally requires roughly 300,000 tons to supplement her local grown supply. The bulk of the Indian surplus goes to European countries, to Ceylon and, through the Straits Settlements or direct, to the Dutch Indies. The Siamese surplus is chiefly distributed through Singapore and Hongkong to the Dutch Indies and the Far East and nearly all the Indo-China surplus goes to the Far East. Owing to our re-export trade it is not possible to say in what ratios these three countries supply Malaya's deficit.

(Note.—These figures exclude China from which export is prohibited and which consumes rather more than it produces.)

2.—The Normal Rice Supply and Consumption of Malaya.

2. (*a*) *As a whole.*—The Federated Malay States with a population of $1\frac{1}{4}$ millions imports on an average 170,000 tons of rice per annum or reckoning 50 gantangs per head and 300 gantangs to the ton, enough to feed just over one million persons and feeds the other quarter million with locally produced padi. This agrees with the crop and cultivation estimate of the Agricultural Department—*i.e.*, 130,000 acres under padi, producing just under 100 gantangs of rice per acre or food for 250,000 persons.

Johore imports practically the whole of its rice but the other four unfederated States—Kedah, Perlis, Kelantan and Trengganu—apparently produce just about enough rice to supply the needs of their population of 750,000 persons, or on the same calculation basis 125,000 tons. Of this, judging from the figures available Kedah and Kelantan each produce about 45,000 tons, Trengganu 20,000 tons, and Perlis 7,000 tons.

The Straits Settlements and Johore with a population of roughly 900,000 persons require some 150,000 tons annually, of which, about 20,000 tons is local grown and 130,000 imported.

If the above figures are approximately correct Malaya as a whole produces about 183,000 tons of rice and requires to import 300,000 tons giving, at one ton of rice per annum for every six persons, food for 2,898,000 souls; a calculation which the census figures confirm.

The local grown production should therefore feed just over one million persons—that is to say the whole of our Indian population (of say 260,000) and half the Malay population (of say 1,400,000)—leaving rather less than 2,000,000 Chinese, Malays and mixed nationalities dependent on imported rice. Normally, less than one-third of the locally grown padi comes to the mills which get about 35,000 tons of rice from Kedah padi, 16,000 tons from Krian padi, 6,000 tons from Straits padi, and 2,000 tons from Perlis padi or in all some 59,000 tons of rice from local padi—*i.e.*, enough, to supply 354,000 persons with food, while 744,000 persons pound local padi for themselves.

3. (*b*) *Local supplies.—The normal rice supply and consumption of Malaya excluding the four unfederated and rice producing States.*—If the four unfederated Malay States, in which the Malay population predominates largely over the foreign settlers are omitted (Johore has as many foreigners as Malays and gets all its rice through Singapore—so should be included in the Straits) the position is much altered for the worse as we get a population of nearly 2¼ million producing roughly 65,000 tons of rice and importing 300,000 tons. Of the local production some 22,000 tons or enough to feed 132,000 (*i.e.*, about half our Indian population) goes to the mills, the balance feeding 258,000 persons who pound their own padi

4. Rice consumers in Malaya as a whole are divided into four classes.—

A.—The peasant class who convert padi to rice for themselves and who on the above calculation amount to about 744,000 persons.

B.—The Indian who eats parboiled rice—say 260,000 persons.

C.—The average working class who eat Rangoon rice because they cannot afford the more expensive Siamese article, many of whom would come under Class A, if there were enough local grown padi available. This class also consumes the white rice produced at the local mills.

D.—The richer class who eat Siamese rice.

When the price of imported rice goes up Class A increases at the expense of Class B.

5. *Imported supplies.*—Of our imported supplies, that from Indo-China is always very uncertain as the crop varies enormously and as France and her colonies, aided by protective tariffs, have first claim while Hongkong, China, Japan and the Philippines draw their rice imports from Indo-China, Malaya can only count on supplies from Indo-China in good years when the surplus is large and the price down and even then has to share the surplus with the Dutch Indies.

Our supply from Siam (from which in 1916 we took for ourselves or for re-export 53 per cent. of the total surplus) is more certain but here again the crop is subject to considerable fluctuations. In any case, Siamese rice is not a cheap rice and is therefore not fitted to form the staple food of our poorer classes. It is from Burma that we usually get our cheap imported rice. For the last 20 years padi at the Burma mills has been between 7 cents and 8 cents per gantang, which would give rice at about 27 cents per gantang (parboiled at 25 cents) in Rangoon or with the pre-war freight of about 1 cent per gantang and the export duty at roughly 1 cent per gantang—rice in Penang at 29 cents per gantang (parboiled 27 cents).

This would give our consumers in Class (C) rice at about 31 cents per gantang and our consumers in Class (B) parboiled at 29 cents per gantang, but in comparing Class (A) and Class (C) it must be remembered that hand-pounded padi gives a full gantang of rice to every 2 gantangs of padi so that if they get their padi at 13 cents, their rice would cost them only 26 cents per gantangs plus their labour.

3.—The Local Rice Position at Present and the Effect of the War on Rice Supplies to Malaya,

(*a*) Local (*b*) Imported.

6. (*a*) *Local Supplies.*—The first effect of the shortage of shipping and high freights has been to increase the consumption of local grown padi under class (A) at the expense of Classes (B) and (C); the padi planters of Kedah, Krian, Perlis and the Straits holding over about two-fifths instead of the usual one-fifth of their padi, for local consumption, so that the mills can only count on enough local padi to produce 48,000 tons of rice or enough to feed 288,000 persons as against 354,000 persons in normal times.

Moreover, a considerable portion of this 11,000 tons is being genuinely held over to cover contingencies so that there is not a corresponding increase in the number of consumers who pound their own padi for rice (Class A). The break up of the milling combine, coupled with this shortage in the padi available for milling has resulted in keen competition among the millers and an abnormal increase in the price of local padi and of the rice produced therefrom. The millers, with padi stocks for three or four months, bought at an inflated figure, were not in a position to sell rice at a profit at less than 37 cents per gantang for parboiled and 39 cents per gantang for white rice, and to cover themselves from probable loss at having to sell part of their stocks at less than these figures, naturally, put their prices up several cents above these rates.

(*b*) *Imported supplies.*—The lack of shipping, high rates of freight and the prime cost of the rice make imports from Indo-China both difficult and unsuitable for our needs.

The Siamese crop was much damaged by floods and though this shortage was partly counterbalanced by the cessation of export to Europe, the local price is high. With rice at Bangkok at 37 cents per gantang (and padi therefore presumably about 13 cents) the normal cost at Singapore with freight at 25 cents per pikul would have been roughly $38\frac{1}{2}$ cents per gantang but freight having increased to $1.60 per pikul, the cost in Singapore would be $46\frac{1}{2}$ cents per gantang or nearly 50 cents per gantang by the time it reached the consumer.

In Burma the crop is abundant and thanks to shortage of shipping the price of padi very low. Over a period of 20 years the average price has been between 7 cents and 8 cents per gantang but fell to 6 cents or less and was even then unsaleable at the beginning of the year. The Royal Commission on wheat supplies is now purchasing 100,000 tons of rice per month and has fixed the price of the padi milled at 7 cents per gantang but as this arrangement only disposes of the surplus formerly exported to Enemy Countries and to England, there are ample supplies available for Malaya. The cultivators and smaller millers are petitioning to get the price for padi fixed at 8 cents instead of 7 cents but even so, there should be a very large supply of rice at Rangoon available for export at not more than 27 cents (25 cents parboiled). Adding 1 cent per gantang for export duty, the rate at which it reaches this country is purely a question of shipping. The pre-war freight of 8 annas per bag has gone up to rupees 4 and even rupees 6 or from 1 cent to 9—14 cents per gantang but even so shipments have reached Penang at 35 cents per gantang and unless there is a complete dearth of shipping, Malaya should be sure of ample supplies at about this rate.

4.—Rice War Measures Taken in Four Other Countries.

7. *In British Guiana,* (which gets a crop of nearly 570 gantangs of padi per acre, converts to parboiled rice and has a small surplus for export) the export of rice has been prohibited except under licence and the export duty increased; the maximum price of rice has been fixed at 38 cents (American) per gallon or say $61\frac{1}{2}$ cents per gantang in Straits currency. The price of padi on the other hand has not been fixed and there are consequently bitter complaints from the cultivators that despite the price of rice they are not getting a fair price for their padi.

In Japan (where thanks to intensive cultivation the production had almost equalled the consumption) the Government is controlling the sale and importation of foreign rice and has fixed the price thereof, paying the difference to importers where the fixed price does not allow a fair profit. This measure keeps down the cost of rice but is adverse to instead of helping the padi planters.

In Burma, the Royal Commission on wheat supplies is purchasing 100,000 tons per month and has fixed the price of the padi from which this is produced at 7 cents per gantang. The order for this rice has been given to some of the larger mills, who are milling for the Government at a fixed rate per ton, and export is prohibited except under licence. These steps do not appear to have helped the padi planter, who finds that, with the cost of all the articles he has to buy going up, he is only getting about 4 cents per gantang for his padi up country and there is consequently a general agitation for the fixing of the price of padi at 8 cents per gantang.

In the Philippines (which imports about one-third of its rice) a Rice Dictator has been appointed and placed in full control of the importation, sale, and distribution of rice, with authority to fix the price. With the help of the local Chinese rice merchants the price has been lowered and fixed.

It should be observed that of these measures two are solely designed to protect the consumer at the expense of the padi planter—while the other two, presumably designed to protect both producer and consumer—have been unsuccessful as regards the interests of the producer.

5.—The Conditions necessary for a large Rice Production.

8. For successful rice cultivation on a large scale besides suitable land, seasons and climate it is essential to have either:

(*a*) A large and uneducated peasant population with no alternative occupation—*i.e.*, plenty of cheap labour; or,

(*b*) Scientific methods—a high grade of rice—intensive cultivation and agricultural machinery.

The most prominent examples of the former class are Burma, the Netherlands East Indies, Siam and Indo-China and of the latter class Japan, Italy, Spain and the United States of America.

The real governing factor is the local value of the rice producible in terms of the local labour market, for example—in Australia—despite heavy crops—an unlimited area of suitable land—a heavy protective tariff and a State bounty on all rice produced, rice cultivation is almost extinct, as even with rice at 2*d.* per lb. (say 56 cents per gantang) the profit on a rice crop is small compared to that obtainable by employing the same labour in other cultivation.

Again, in Japan—the local price of rice increased in 13 years by 70 per cent. and during that period rice production increased in the same ratio till Japan—from being one of the largest importers of rice—became an exporter but no sooner had this position been reached than the price of rice fell heavily with the result that Japan is now importing rice again.

Again, in the Philippine Islands "48 per cent. of the area cultivated was under rice (1914) but it is not a proportionately valuable crop and the amount of rice produced from year to year is influenced by the demand for labour in other directions." Without further elaborating the argument it seems clearly established that: (*a*) No country with other resources available should attempt to produce rice as a source of wealth or for the export trade and (*b*) The proportion of its rice consumption that a rice eating country should produce instead of importing depends entirely on the economic relation of the local value of labour to that of the rice producible—for example—no reasonable person could argue that except as a temporary war measure and in face of actual famine, it would be to Malaya's advantage to become self supporting in or even a large exporter of rice—if this position were only attainable by diverting the necessary labour from rubber or tin and the last Federated Malay States Census shows 97 per cent. of our total male population of over 12 and 70 per cent. of the total female population of over 12 as working for their living.

Malaya, moreover, is in the centre of the rice producing countries and is better situated to import rice than any other country in the world.

The estimates of the cost of cultivating and reaping an acre of rice differ enormously. In Malacca it is given as $30 per acre—In Krian (where the work is done by hand), it costs $20.40 if done by hired labour and $16.90 (value of labour) if done by the owner. Where land can be ploughed it costs rather less but in any case it is obvious that if the value of the rice produced is less than the value of the labour employed the cultivation of rice is not an economically sound proposition. Now the average padi crop for Krian is about 300 gantangs per acre—for Malacca about 280 gantangs and for the Federated Malay States, Kedah and Perlis about 200 gantangs. The average padi production for Malaya is then a little over 200 gantangs per acre and the utmost that one man can cultivate is 3 acres (and even then he would require help at harvest time.) In these terms the year's work of the padi planter would produce enough to feed six persons who pound their own rice or rather less than five persons if the rice were milled or if we take the labour value at $20 per acre (which is about right for Krian at any rate) we get the labour value of the padi as $60 for 600 gantangs of padi—*i.e.*, 10 cents per gantang. On the other hand the same man working at 40 cents per day in other employment for 300 days in the year produces a value of $120. To equalise matters it would be necessary to value the padi at 20 cents per gantang but this would make it impossible for local grown padi to compete with imported rice and, as it would appear that Burma rice is available at 27 cents per gantang in peace time and at 35 cents per gantang in war time, a fixed price of 13 cents per gantang in war time and of 9 cents per gantang in peace time is the highest price possible to fix for local grown padi without adopting some form of protection.

On the above calculation 13 cents per gantang would only leave a profit to the grower of $18 on his year's work above the value of his labour and 9 cents per gantang a loss of $6, making his year's work worth $78 in the one case and $54 in the other.

In Burma, where the average yield is rather larger than that of the Federated Malay States there is almost an acre under padi for each head of population—that is to say one-third of the total population is employed on rice production—and this leaves about half the total crop available for export but in Burma there are no competing corps, little or no intensive cultivation, and a large peasant labour force without other occupation, while Bengal supplies additional labour at harvest time.

In Cochin-China there is over an acre under padi for each head of the population so that more than one-third of the total population are padi planters—the yield here is similar—there are no competing crops and nine-tenths of the total cultivated area is under padi. This gives a similar surplus available for export. In Siam similar conditions prevail, five-eighths of an acre of padi being under cultivation for every head of population but the yield is higher so that only a quarter of the population are padi planters.

Now it is quite certain that we must not attempt to follow the example of either of these three countries by converting either one-third or one-quarter of our population to padi planters, as this could

only be done at the expense of rubber, tin, coconuts and other industries. On the other hand, Japan, with a population of 53,000,000 persons—thanks to intensive cultivation, inter-cropping and scientific methods, fed her population from some 8,000,000 acres —that is to say she required only (at most) 3,000,000 persons (or less than 6 per cent. of her population) to feed her with rice—her crop being three times as heavy as that in the Federated Malay States or Burma, one man's labour feeding between 15 and 18 persons instead of between 5 or 6, and, on the previous calculation, the year's work of the padi planter being worth $234 with padi at 13 cents and $162 with padi at 9 cents per gantang.

Applying the moral to ourselves we find that at our present rate of production per acre we should require from one-fifth to one-sixth of our total population as padi planters to supply our needs—whereas, if we could increase our production per acre to equal that of Japan not only would one-fifteenth of our population amply suffice but they would be profitably employed instead of at a loss. If such a result were obtainable it would be economically sound to divert sufficient of our labour from rubber and tin to make Malaya at any rate self supporting in rice but not otherwise.

With our present methods of rice cultivation it is obviously not desirable to divert any of our Chinese or Tamil labour from the occupations in which they are already more profitably employed to padi planting, and Kedah, Perlis, Kelantan and Trengganu are already doing their share by employing their Malay peasantry on rice cultivation and producing enough rice to feed themselves. The total population therefore available for rice cultivation is that proportion of between 700,000 to 800,000 of our Malays who are not already better employed and the population they have to provide rice for is $2\frac{1}{4}$ millions—that is to say if every Malay man, woman and child in Malaya cultivated two acres of padi, it would barely suffice for our needs. The area they at present so cultivate is about 200,000 acres, and as few cultivate to their full three acres capacity an estimate of 100,000 Malays more or less exclusively so employed is probably not far from the mark.

The Federated Malay States census figures give just over 65,000 padi planters out of 430,000 Malays with a cultivation of 125,000 acres of padi; by analogy we should get in the Straits and Johore with just under 300,000 Malays, some 40,000 padi planters and 75,000 acres of padi which very closely confirms the figures arrived at independently.

The local distribution of the Malays and of available padi lands and the fact that most of them follow some supplementary occupation makes it impossible to increasse the area cultivated by each Malay padi planter from two to three acres and at the last Federated Malay States census 70 per cent. of the Malay males over 12 and 54 per cent. of the Malay adult females were engaged in agriculture.

There is, however, a steady increase of about 4 per cent. yearly in the Malay population and possibly another 20 per cent. of the existing population might be attracted to padi planting by suitable measures. In default of the importation of cheap labour for the

purpose or of a greatly improved yield of padi per acre, it would therefore appear that the only steps possible are (*a*) to make padi planting sufficiently attractive to keep our present padi planters in this employment, (*b*) to attact another 20 per cent. of the Malay population to this employment, (*c*) to attact the 4 per cent. annual increase in the Malay population to this employment instead of to other work. This policy would appear to be a sound one as—while other labourers produce a greater value in other employments—the Malay is not a success as a mining or estate cooly and finds his proper avocation as a padi planter or fisherman. Such a policy, though it would never make Malaya with its large alien population self supporting in rice production, would steadily tend to diminish the adverse balance of our rice production as against our imports.

6.—Rice Milling Locally.

9. (*a*) *Local milling history.*—Omitting the Singapore mills, which usually import nearly all the padi they mill from outside Malaya and of which I am not in a position to write, Penang, the Province, Krian and Alor Star contain sufficient rice mills to deal with all and more than all the locally produced padi that is available for the milling trade—in fact with the decrease of the padi producing area in Malacca and Province Wellesley and the erection of new mills, there has not been enough padi to go round and several mills have been closed down. In 1912 the position was that there were eight largish mills, four in Penang—one in Alor Star—one at Kuala Kurau—one near Kuala Krian and one at Prai, capable of treating all the padi available for milling and of these eight, seven formed a combine with a capital of $1,000,000 in shares of $50 each, the object being to prevent competition and to keep the price of padi down by financing the harvest. The combine closed three mills—one in Penang and two in Province Wellesley (Prai and Kuala Krian) and for a time worked the other four at a large profit but with the erection of a second mill in Krian and another at Alor Star profits decreased and the decision of Government to build mills in Kedah and Krian finally broke up the combine. Two of the Penang mills have been recently put out of action by fire but even so two of the mills remain closed for lack of padi supplies, because this year, for reasons already given, only some 70,000 tons of padi are available for milling instead of the normal 90,000 tons.

The padi shortage—which was accentuated by the purchase of local grown padi for the Singapore mills—resulted in keen competition among the millers who were all compelled to make large advances to the various middlemen and to take all the padi they could get even at 15 cents per gantang ($3.75 per pikul). The Alor Star mills are rather better off in this respect having to some extent financed the Kedah crop and so got their padi cheaper and a larger stock of it as well, but taking the mills as a whole they hold only between three and four months stocks in hand for milling and this stock has cost them between 13 cents and 14 cents per gantang ($3.25 to $3.50 per pikul), while there is comparatively little more milling padi available for them until the next Kedah harvest. The Kedah mills have actually paid rather less for their padi but the export duty they have to pay on the rice produced very nearly equalises this.

(*b*) *The working of the mills.*—There are minor differences in the calculations and estimates, which the various millers have been courteous enough to place at my disposal, and the different types of machinery used and the variations in the quality of the padi usually treated naturally affects the proportionate production of rice from padi and the amount of the bye-products, but the figures given below are a fair average.

(1) *Ratio of rice by measure and by weight to padi milled.*—The best Krian padi gives as much as 44½ per cent. by measure of parboiled rice and some of the Kedah padi as little as 41 per cent.; by weight, the variation is from 66 per cent. to 61 per cent. The smaller the production of clean rice the larger the proportion of bye-products and if we allow for this when dealing with bye-products, as nearly all the mills treat padi of several grades, a proportion of 63 per cent. by weight and 43 per cent. by measure would work out a fair average for parboiled rice; and on this basis (100 gantangs padi = 43 gantangs parboiled rice) we get—

	Price of padi per gantang.	Price of parboiled rice per gantang.	Margin on milling 100 gantangs of padi to cover cost and profit (excluding bye-products.)
	cts.	*cts.*	$ *cts.*
Standard padi at 25 gantangs to the pikul.	14	38	2 34
	13	36	2 48
	12	34	2 62
	11	32	2 76
	10	30	2 90
	9	28	3 04
	8	26	3 18 and so on,

that is to say, for each 1 cent decrease in the price of padi, the price of parboiled rice decreases 2 cents and the margin for cost and profit increases by 14 cents.

Comparatively little white rice is milled, as the local grain, though sweet, is small in size and the market therefore limited. Local padi milled for white rice gives a larger proportion of bye-products but only 38 per cent. by measure and 57 per cent. by weight giving the following series:

	Price of padi per gantang.	Price of white rice per gantang.	Margin on milling 100 gantangs of padi to white rice to cover cost and profit (excluding bye-products.)
	cts.	*cts.*	$ *cts.*
Standard padi at 25 gantangs to the pikul.	14	40	1 20
	13	38	1 44
	12	36	1 68
	11	34	1 92
	10	32	2 26
	9	30	2 50
	8	28	2 74

that is to say, for each decrease of 1 cent on the price of padi, the price of white rice decreases by 2 cents and the margin for cost and profit increases by 24 cents.

(2) *Bye-products.*—In the case of parboiled rice the bye-products vary from 1 per cent. of broken rice and 10 per cent. meal to 4 per cent. broken rice and 10 per cent. meal, so that on milling 100 gantangs of padi the bye-products are from half to 2 gantangs of broken rice at say 23 cents (*i.e.*, from 12 cents to 46 cents worth of broken rice) and about 25 katties of meal worth about 50 cents; as the greater the bye-products the less the clean rice produced an average value of 75 cents for the bye-products on milling 100 gantangs of padi to parboiled rice would be about a fair allowance.

In the case of white rice the bye-products are from 7 per cent. to 12 per cent. of broken rice and from 17 per cent. to 20 per cent. meal so that the value of the average bye-products on milling 100 gantangs of padi are 4 gantangs of broken rice worth say 90 cents and 50 katties of meal worth about $1 or $1.90 in all. For bye-products we have therefore to add to the previous margin 75 cents in the case of parboiled rice and $1.90 in the case of white rice making the margin in each case very closely identical with padi at 14 cents, though, as the price of padi falls the figures become more favourable to the making of white rice when there is a market for it

(3) *Milling costs.*—Milling costs depend more on the output than on the details of management and the nearer the mills can run to their full capacity the lower the costs and *vice-versa*. Estimating on the supplies of padi they expect to obtain, the millers as a body, put their costs at $4\frac{1}{2}$ cents per gantang or $1.93 on milling 100 gantangs of padi for parboiled rice (43 gantangs) and $1.71 on milling the same for white rice (38 gantangs). Working at full capacity the figures I have checked would give a milling cost of only 3 cents per gantang but on the other hand, where padi supplies have been short they have worked out as high as $6\frac{1}{2}$ cents so that on the whole I consider an estimate of $4\frac{1}{2}$ cents per gantang a fair one.

(4) *Profit.*—This is a difficult item to estimate as besides the capital invested the millers have to make large advances without interest in order to obtain padi. For the two Krian mills working at two-thirds full capacity a profit of 10 per cent. would mean 2 cents per gantang and this is, I think, on the whole a fair, if low, allowance to make for parboiled rice. For white rice which gives a smaller proportion per 100 gantangs of padi milled and is more difficult to sell, an allowance of at least 3 cents per gantang should be made and turning to our previous tables we get—

(*a*) Margin on milling 100 gantangs padi to 43 gantangs of parboiled rice—Padi at 14 cents=$2.34 add bye-products 75 cents=$3.09 deduct milling costs $1.93 and profit 86 cents=*30 cents.*

Similarly the figure at 13 cents=44 cents; at 12 cents =58 cents; at 11 cents= 72 cents and so on.

(*b*) Margin on milling 100 gantangs of padi to 38 gantangs of white rice—Padi at 14 cents=$1.20, add bye-products $1.90=$3.10, deduct milling costs $1.71, add profit $1.04 =35 cents. Similarly the figure at 13 cents=59 cents; at 12 cents=83 cents; at 11 cents=$1.07 and so on.

(5) *Contingencies and profits in the milling business.*—Against this margin we have to place "Contingencies," a very doubtful item—especially as local parboiled rice keeps badly (in any case for not more than 6 weeks and if rain hinders drying only for 14 days) but it seems fairly clear from the preceding figures that if the price of padi is high and supplies scanty the millers find it difficult to make 10 per cent. on their capital, while if padi supplies are plentiful and the price low, even with a corresponding fall in the price of rice, their profit is a good one. The millers are, however, always running a big risk as cheap imported supplies are always liable to leave them with stocks they can only sell at a loss and unless there is some form of protection they are bound to put up their prices considerably when they can to cover this risk. In Siam for example the price of rice is said to have fallen 10 cents per gantang within the last few days owing to shortage of shipping for export and the millers there presumably must either hold up their stocks of sell at a loss.

7.—Deductions and Recommendations.

Deductions.—(1) Except as a temporary war measure we should make no attempt to grow all our own rice as we have not sufficient peasant population nor is it possible to introduce sufficient cheap labour for this purpose.

(2) We should take steps, to increase our rice production by about 20 per cent. to keep the present padi planters from being drawn off to other occupations and to attract the increase of the Malay population to padi planting.

(3) Our local grown rice is not suitable for white rice. Sufficient should be parboiled to supply our Tamil population and the balance converted to undermilled or hand-pounded rice for our Malay population.

(4) To lessen the economic loss sustained by the employment of part of our population as rice cultivators under present conditions, the production of rice per acre must be increased, and the system of a secondary crop introduced.

Recommendations.—(A) All land suitable for rice cultivation should be ear-marked and reserved for that purpose.

(B) In order to keep our present padi cultivators and steadily, if slowly, increase our padi supply, we should for the present fix a price for padi which will give our padi planters a reasonable return for their labour and guarantee this price for at least three years. This price should be 13 cents per gantang at the mills or $3.25 per pikul at the option of the millers (giving parboiled rice at 36 cents per gantang). The newly sanctioned system of advances to padi planters has in Krian, at any rate, almost entirely met the difficulty of financing the crop and freed the padi planters from the clutches of the middleman. When we are in a position to help the padi planter to increased production by means of a heavier rice crop and a catch-crop (*vide* D) the price of padi can be lowered. Protection now and improved cultivation later should be sufficient to attract our Malay peasants to rice cultivation. Padi at 13 cents in Malaya and at 8 cents in Burma is valued at about the same rate n terms of the local value of labour in each country.

(C) To regulate the price of padi we must also to some extent control the price of rice. As hand-pounded or undermilled rice with padi at 13 cents would be only 26 cents per gantang plus the labour and we are not likely to get white rice cheaper than this there is no need to control the import of white rice. On the other hand buying padi at 13 cents the millers cannot afford to produce parboiled rice at 36 cents unless they are protected from the risk of foreign importation at a cheaper rate. We should therefore fix the maximum price of parboiled rice at 36 cents and control importation. The local rice millers have met Government in every possible way and agreed to every suggestion or proposal made to them and Government should therefore organise the trade in parboiled rice on fair lines. Normally, some 90,000 tons of local padi, producing some 60,000 tons of rice, is available for milling or enough to feed some 360,000 persons. With the price of parboiled rice fixed and importation controlled it should not be difficult to book the orders of all consumers of parboiled rice for a period of three years and to distribute them among the mills. The surplus local-grown milling padi (if any) should be converted to undermilled rice and Government Departments which are at present using parboiled rice should take over, at any rate, a portion of this and the sale thereof should be encouraged in every way. By booking orders for three years and controlling prices and imports for the same period Government should be in a position to make definite arrangements and to avoid all chance of loss.

As to the question of Government mills it is obvious that, if the Chinese mills are being controlled as suggested, and these mills are capable of converting the whole of the local padi available for milling to parboiled rice, there is no object in Government putting up mills to make parboiled rice. If, however, there is a balance of milling padi available after satisfying in full the demand for parboiled rice ascertained as above, which the existing mills are unwilling to undermill for Malay consumption, then there is still a case for Government mills. In Kedah, considered as a separate unit, the case for a Government mill is very strong, as Kedah, which grows enough to feed more than its whole population, is exporting rice and padi at a far lower rate than that at which almost two-thirds of its population buy imported rice; so that for Kedah it is obviously economically sound to try and get more of their population to consume local grown rice. If my estimates of supply and consumption are correct Kedah could feed about another third of her population with undermilled local grown rice and still leave the mills with enough padi to supply the whole local demand for parboiled rice. Obviously, however, there is not in this case room for a Government mill in Krian till local padi supplies considerably increase.

(D) Even with a fixed price of 13 cents per gantang and a system of advances to finance the crop and keep him out of the hands of the middleman, our average padi planter is producing by his labour only half of what his year's work would produce in other employment and unless he is a fisherman or has some other supplementary employment he spends nearly half his year idle or on odd jobs.

On the other hand both from local experiment and from the experience of countries like Japan we can see that any elaborate system of manuring or intensive cultivation will only pay when the

price of padi is very high. The remedy is therefore either two crops of rice in the year or a catch-crop between seasons. For the Malay States I strongly incline to the latter as offering more attractions and requiring less continuous labour than the former, especially as two rice crops per annum would not be possible in areas which were not controlled by irrigation. The Malay will have nothing to do with seed selection, catch-crops, or any other innovation of which he is not given practical demonstration and I therefore strongly urge that such demonstration be given. A considerable block of land, which has other available and similar land near it—say for preference a block in the new Briah irrigation scheme area, should be selected—selected seed should be used and catch-crops of two or three varieties (of which green gram, *Phaselus mungo*, should be one) should be reaped off it. The work should to a great extent pay for itself and there is no doubt but that if it is a success the Malays will take up the adjoining lands and crop them on the same system A fair padi crop and a successful catch-crop on these lines would go very near to making padi planting in the Federated Malay States an economically sound and popular occupation.

LALANG GRASS AS A PAPER MATERIAL.

By B. J. Eaton.

THE utilization of lalang grass—*Imperata arundinacea*—as a source of raw material for the manufacture of paper was under consideration over twelve years ago when the writer first came to the country and samples of the half-stuff were examined at the Department of Agriculture by him also in 1911. A small plant for the conversion of the material into half-stuff was being worked on an experimental scale by Mr. ffolliott Pears of Tampin Linggi Estate and a report on the grass as a paper making material by Messrs. Beadle and Stevens, the well-known paper and rubber chemists, was also published. Unfortunately, the writer has no reference at the moment to this report.

Previous to this, experiments had been carried out by Messrs. Cross, Bevan and Beadle, cellulose experts, in 1907 and the results, which agree with those now recorded, are contained in the *Agricultural Bulletin, F.M.S. and S.S.*, Vol. VI, 1907, page 379, *et. seq.*

Mention is also made of a concession, which had been granted as early as 1891 by the Sultan of Johore for the utilization of lalang in Johore for paper making. Those interested in the details of this concession, which appears never to have been worked, are referred to the above article and to another in the *Agricultural Bulletin, S.S. and F.M.S.*, Vol. VII., 1908.

It was estimated that the cost of cutting and delivery to factory would amount to 10*s.* per ton and an estimate of 15*s.* per ton was allowed for working purposes. The cost of a mill for the manufacture of 3,000 tons per annum of half-stuff was then estimated at £8,000 plus an additional £6,000 for freight, erection, buildings, water supply, etc. It was estimated that the cost of producing unbleached and bleached pulp would be £4 15*s.* 4*d.* and £7 9*s.* 10*d.* per ton, respectively, after allowing for recovery of the soda used.

Raitt, the fibre and paper expert of the Forest Department in India, has also referred to Indian lalang in a report on the utilization of Indian grasses as paper making materials (*Agricultural Bulletin, F.M.S.*, Vol. II, No. 6, 1914), and concludes that this grass is very inferior compared to many other Indian grasses for this purpose. (*Agricultural Bulletin, F.M.S.*, Vol. III, No. 9. 1915—"The Empire's Resources in Paper Making Materials).

It is the intention of the Agricultural Department to investigate the value of lalang and other indigenous products as sources of paper making material and an experimental plant for such purposes was erected at the Department in 1914 but the shortage of staff in the chemical division, owing to the outbreak of war, has so far prevented the undertaking of this work, which will be initiated as soon as the full staff is available.

In 1917 at the request of the Director of the Imperial Institute a sample of the dried grass weighing 178 lbs. was collected by the Agriculturist and forwarded to the Imperial Institute for investigation and the report on this investigation has been received recently.

The following are details of this report:

Description of sample.—The sample consisted of well grown lalang measuring from 36 to 54 inches in length, the leaves measuring up to 0.6 inches in width.

Results of examination.—A chemical examination of the grass gave the following results:

	Per cent.	
Moisture	9.2	
Ash (mineral matter)	4.0	(calculated on dry material.)
Cellulose	56.0	

Length of ultimate fibres 0.4 to 3.0 mms., mostly 1.0 to 2.0 mms.

Results of pulping experiments.—The grass was submitted to treatment with varying quantities of caustic soda, similar to those used for the production of paper pulp on a commercial scale, yielding the following results:

Caustic soda used.		Condition of boiling.		Caustic soda consumed on grass as received.	Yield of dry pulp expressed on 100 parts of air-dried grass.
Parts per 100 parts of grass.	Parts per 100 parts of solution.	Time.	Temperature.		
		(Hours).	(°C).	per cent.	per cent.
D. 8	4	$6\frac{1}{2}$	140	7.0	46
A. 10	4	5	140	8.0	43
B. 16	4	5	140	12.4	41
C. 20	4	5	140	15.4	40

The results show that lalang grass gives a good yield of long fibred pulp which has excellent felting properties and produces a strong opaque paper, which does not shrink on drying.

The pulp obtained by treatment with eight per cent. of caustic soda has a greenish-brown colour but does not bleach; with 10 per cent of caustic soda the pulp is of a paler greenish-brown colour and only bleaches to a cream colour; treatment with 16 per cent. of caustic soda, *i.e.*, under conditions similar to those employed for esparto grass, yields a pulp of pale colour but not as pale as that from Algerian esparto grass; this pulp bleaches to a pale cream colour; with 20 per cent. of caustic soda the unbleached pulp is of a pale colour and bleaches to a good white.

Conclusions.—It is concluded as a result of these experiments that lalang grass compares favourably as a paper making material with Algerian esparto grass but is inferior to Spanish esparto grass.

Algerian esparto grass yields about 42 per cent. and Spanish esparto grass about 50 per cent. of pulp when treated under the conditions of experiment B compared with a yield of 41 per cent. from the lalang grass. The lalang grass pulp is similar to that from the Algerian esparto but not so good as that from Spanish esparto grass.

Lalang grass appears to require slightly more drastic treatment than Algerian esparto, if the pulp is to be bleached and used for the manufacture of white paper. Unbleached pulp of good quality, suitable for strong wrapping paper or cardboard, can, however, be produced by comparatively mild treatment of the grass. Such pulp is of a greenish-brown colour but this should not prove an objection to its use.

Owing to its bulky nature, lalang grass could probably not be exported commercially from this country, as it would be worth only about the same price as Algerian esparto, which under pre-war conditions fetched from £3 10*s*. 0*d*. to £4 2*s*. 6*d*. per ton (June, 1914). It is suggested, however, that the grass might be converted into pulp locally and exported as such or used locally for the production of paper.

The specimens of bleached and unbleached paper received with the report, prepared by the different treatments mentioned, confirm the results given in the report.

Remarks.—This report confirms the results of previous investigation of this grass referred to above and our own opinion as to its possibilities for paper making purposes and adds nothing new to our previous knowledge of the paper making qualities of the grass.

It should be pointed out, however, that the information we now require is on the cost of collection and cropping possibilities of the grass, *i.e.*, how frequently the grass can be harvested, together with the future yields obtainable under different conditions of cropping, and whether any deterioration in yield takes place on continued cutting. Only after investigation on these lines has been undertaken locally, will it be possible to ascertain the area required to supply the demands of a paper mill on a commercial basis. It should also be mentioned that the areas under lalang in this country have decreased considerably during recent years, since such land has been utilized in many districts for the planting of rubber, owing to its freedom from old jungle stumps, etc. In concluding these remarks, reference might be made once again to the possibilities of other paper making materials in Malaya.

The experimental cultivation of *Hedychium coronarium* a species of ginger, and also of other wild ginger plants has been made on a small scale, but these plants do not appear to thrive under exposed plantation conditions, and prefer shade. The first named created a mild sensation a few years go and was investigated also by Messrs. Clayton Beadle and Stevens, but does not appear to have been developed commercially in any country.

With regard to the utilization of wood pulp in this country, the writer again draws attention to the mixed nature of the forests of

Malaya and the unsuitability of mixed woods generally for the manufacture of paper pulp, owing to the varying treatment required by woods of different texture.

It is hoped, however, at some future date to carry out investigations on some of the softer woods.

The following observations made by Mr. Raitt, consulting cellulose expert to the Government of India, Forest Department, in a lecture delivered at the Indian Museum, Calcutta, should be of interest.

"For the last 40 years wood pulp has provided from 75 to 80 per cent of the raw material of the world for paper manufacture, derived chiefly from coniferous woods, especially spruce, from Northern Europe, Canada and America. When the utilization of wood commenced, the world's consumption of paper was about four million tons and the forests available were considered inexhaustible and reafforestation was not considered. To-day the consumption is 10 million tons and is growing at the rate of 25 per cent. in every ten years. The demand for timber has also increased and the limit of size for wood pulp has dropped from wood of 12 inches diameter to 6 inches and in some places to 4 inches. Further the cost of the raw material is increasing owing to the greater distance from which it has to be brought to the market. It may be taken as a fundamental principle in paper manufacture that only material which is of no use for any other purpose can be employed. Thus for timber purposes 70 to 80 per cent. of the tree can be used, whereas in the manufacture of paper pulp the yield is only 33 per cent. of the tree."

"Paper makers no longer prepare their own pulp from raw material owing to cost of transport and thus the pulp industry is now situated near the raw material and the pulp transported to the paper manufactory which is naturally situated near the consumer."

Mr. Raitt also issues a note of warning to those, including, incidentally, eminent scientists, who have stated that a paper famine is unthinkable owing to the fact that paper can be made from any vegetable matter. While this is true theoretically, in practice it may be very fallacious and misleading. Out of some thousands of plants, which are available as a source of cellulose, a large number must be eliminated on account of (*a*) the cost of extracting the cellulose, (*b*) because the cellulose is of no value, (*c*) because they grow in economically inaccessible districts and (*d*) because the cellulose is too valuable for other purposes (*e.g.*, cotton). In India, Raitt has reduced the available raw materials to two, both derived from the Graminaceæ or grasses—*viz.*, bamboos and one or two Savannah grasses. From bamboo, however, it is estimated that 15 million tons of pulp per annum. could be obtained in India and from the Savannah grasses 5 million tons.

In the case of bamboos he estimates a three to five years' rotation and with grasses a two to three years', according to soil and climate. The area available must therefore be sufficient to allow for these resting periods. In the case of bamboo, after long experiment a satisfactory pulp has now been produced.

One factor which is of the greatest importance in the manufacture of paper pulp is transport costs, owing to the large amount of raw material necessary to produce the finished product.

Of sixteen proposals submitted during the last seven years in India, only four have survived investigation owing to the number of factors concerned, one or more of which have rendered the propositions of no value.

These investigations made in India indicate that what is now required, as stated previously in this paper, is an investigation of the areas of raw material, especially lalang, available in this country, and the cropping possibilities of this grass. Sufficient information is available as to the suitability of the grass as a raw material, although no information is yet available as to cost of manufacture, transport of raw material, etc.

MINUTES OF MEETING OF THE PLANTERS' ASSOCIATION OF MALAYA,

held at the Meeting Room of the Association, Kuala Lumpur, on 29th January, 1919, at 10.30 a.m.

PRESENT:

The Honourable Mr. R. C. M. Kindersley (*Chairman*)
„ F. G. Harvey (*Vice-Chairman*)

and the following DELEGATES:

From Batu Tiga D.P.A.	...	Messrs. T. J. Cumming and G. H. Bennett
„ Central Pahang P.A.	...	Mr. P. J. A. Williams
„ Central Perak P.A.	...	Messrs. A. H. Orr, J. S. Ferguson and T. H. Murray
„ Kajang D.P.A. ...	...	„ O. P. Dakeyne, E. G. Leyne and E. N. T. Cummins
„ Kapar „ ...	...	„ Noel Fisher, L. Mooijaart and W. J. S. Price
„ Klang „ ...	...	„ E. B. Prior, C. A. Buxton and H. R. Quartley
„ Kuala Langat D.P.A.	...	„ G. O. W. Symons and F. H. Mustard
„ „ Lumpur „	...	„ F. Clyde Jeavons and D. S. Gardner
„ „ Selangor „	...	Mr. R. S. McCulloch
„ Negri Sembilan P.A.	...	Messrs. V. A. Tayler, R. Gooch, C. Ritchie, G. W. Hingston and J. D. McCulloch
„ Ulu Selangor D.P.A.	...	„ N. H. Dakeyne, G. C. Bailey and W. de L. Brooke

HONORARY MEMBER.—Mr. L. Lewton-Brain (Director of Agriculture).

VISITORS.—Messrs. G. P. Clerk, V. Sauchelli, H. L. Linnell, A. C. Hayton, C. R. Ferrers, B. Biggin, C. N. Crush, W. H. Bragg, T. Donaldson, R. Napier Hendrie and Dr. B. Day.

SECRETARY.—Mr. H. C. E. Zacharias.

1.—MINUTES.

Mr. KINDERSLEY would like—arising from the minutes of the last meeting—to call attention to the report which appeared in yesterday's *Malay Mail* of a general meeting of the Kajang District Planters' Association. He had read the reports of various District

Associations, but found that the Kajang Association was the only one that appeared to be in a state of righteous indignation regarding his appeal to the Association at Penang. It is a matter for regret that he should have injured the sensitive feelings of Mr. E. N. T. Cummins, and the unanimous nine members who completed his general meeting. He was given no notice that his appeal was to be discussed, although he presumes that Mr. Cummins and the Secretary were aware of it, but perhaps it was not desired to hear the other side of the question or to disturb the unanimity of the meeting.

He did not want to detain them. His remarks at Penang were correctly reported in the minutes and he did not intend to enter into explanations here. Obviously, it is a matter of opinion whether his remarks were necessary or not. Mr. Cummins politely said that they are not true. That also is a matter of opinion. The appeal he made at Penang was the result of careful consideration and it had the approval of many of the leading planters in the Federated Malay States, and he presumed that they are also suspected of having sinister designs against the fair name of the Planters' Association of Malaya. He stood by his opinions. They were given with the view of making their debates more valuable and dignified, and to bring about better relations with the Government. They were, he ventured to believe, in the true interests of the Association.

Mr. E. N. T. Cummins says the Chairman had made one or two remarks regarding the Kajang District Planters' Association of which he had the honour to be Chairman. In the first place, their meeting was duly advertised, and he received notice of it. As a matter of fact, however, he had never attended a single meeting since the speaker became Chairman nearly a year ago. He could assure him they wished he had been present at the meeting—none of them were anxious to wash their dirty linen in public, and had he attended that meeting, this matter could have been thoroughly threshed out then. They were obliged to bring the matter up at the District Planters' Association. Mr. Kindersley was wrong to censure, publicly, every individual delegate to the Planters' Association of Malaya. Many of the delegates could not attend that meeting in Penang. It was a poorly attended meeting, and not a representative one. But as he saw fit publicly to censure all of them, the matter had to be threshed out publicly. It was not true that the tone of delegates had been very objectionable, or that extremely harsh criticisms had been levelled at Government. This was not true. As Mr. McCulloch had pointed out at the time they could plead exasperation but for all that their comments had never been unfair or immoderate. He did not believe that they had a bad reputation and thinks that Mr. Kindersley took too pessimistic a view. If harsh criticisms on the Government had ever been passed they had been justified and he would remind the meeting that the Government had often written to them in a very curt, not to say discourteous manner. In fact the Government appeared to treat them as members of an infant school. They were given sometimes a little jam for which they had to say "thank you" and to sit down again. If they were not given the jam they still had to say "thank you" and to sit down again. That attitude of the Government to the Association seemed to be the attitude taken by Mr. Kindersley

towards this Association. This he believes was the largest planting body in the world and entitled to consideration and to be treated not as small children but as men who have been entrusted with the control of one of the largest industries in the world.

Mr. Kindersley had said that it had been in his mind for years to make the remarks that he had actually made in Penang: if so, why had he never spoken before? If anything said by any delegate at any time had been unjustifiable why had he never called any member to order yet? Again, if he wanted to bring up the matter why had he not circularized the Constituent Associations? Or why had he not asked the meeting in Penang to go into Committee, before making his remarks? He had chosen to make the matter a public one and therefore the refutation had also to be a public one. He for one and his Association did not agree that the tone at their meetings was an undesirable one and they therefore moved that the proceedings, appearing under paragraph 2 of the last minutes, be deleted.

He could illustrate his meaning by a reference to pp. 20 and 21 of the same minutes, *i.e.*, the matter of Export Duty. This had been brought forward in a very strong manner by them but instead of being carried on very strongly it was carried on very weakly, as they would see from the advice given by Mr. Kindersley. They should remember that there was an appeal beyond the local Government. As Mr. Macfadyen had pointed out long ago it was possible to bring pressure to bear on the Secretary of State for the Colonies through Members of Parliament at home.

Mr. KINDERSLEY rules that this is not to the point.

Mr. CUMMINS says he only wished to illustrate that the Chairman's remarks at the Penang meeting were not in the least called for and had only brought ridicule on the Association and disgusted most of its members.

Mr. FERGUSON does not wish to labour the point nor did he wish to associate himself with all the remarks made by Mr. Cummins. He would only say that his Association was not at all unanimous in supporting Mr. Kindersley's remarks at the Penang meeting.

Mr. RITCHIE observes that as regards the general question of policy which had been questioned by Mr. Cummins he would point out that none of the delegates present at that time had objected.

Mr. MCCULLOCH says that he had objected and that his remarks had not been accurately reported.

Mr. RITCHIE continues that only one delegate present apparently had objected. It was held that strong resolutions were needed—but to what end? Surely, as an association they had no power at all except to persuade; they could not demand, and it was only common sense to recognize that this was the position. If they wanted to obtain anything from Government it must be obvious that if they approached them in a moderate tone they were more likely to obtain their wishes than by adopting a bullying manner and using very strong language. If Government gave them a plain "no" then as Mr. Cummins had said they had their remedy by going

beyond the Government. He was all for persistency but why should they be abusive as well? The importunate widow was commended but they were not told that she had abused the judge. It appeared to him that many members treated their meetings as a sort of safety valve for the indignation they felt against Government, and if that were so he for one would rather stay at home in his own bungalow than go a hundred miles to use strong language. He could use strong language equally well in his own bungalow.

The two resolutions on Export Duty were an excellent example. They were both identical in purpose but dissimilar in form. Those who advocated the moderate form lost the day, but many members felt strongly that such a tone was undesirable and was not the best policy to get what they wanted from Government. It seemed to him ludicrous to imagine that they could frighten Government by using strong language.

Mr. LEYNE says his Association was unanimously of the opinion that all criticisms of Government should be fair, but they could not understand why therefore all delegates should be censured by the Chairman instead of individual members being called to order by the Chairman for abusiveness.

Mr. HARVEY wishes to be considered responsible for the remarks of Mr. Kindersley at the Penang meeting. He had instigated them and brought up the whole question at a Standing Committee Meeting when action in that sense was agreed upon. He did this after the August meeting when one of the oldest membere, Mr. Gordon-Brown, had protested to him against the language then used. In addition the Chairman of a Constituent Association had told him that if the Planters' Association of Malaya became a blackguarding institution his Association would have to cut itself off. But he repeats that if anybody was to be shot it was himself.

Mr. O. P. DAKEYNE considers the publication of Mr. Kindersley's strong remarks unfortunate to say the least of it. It was a vote of censure passed on the whole Association and he thinks that this was prejudicing their chances with the Government who would naturally after this take little notice of what they said. He certainly supported the proposal of expunging the section "Procedure" from the last minutes.

Mr. MURRAY as a delegate at the Penang meeting would explain that the whole matter was sprung upon them without any warning and without giving anybody a chance of considering the matter.

Mr. KINDERSLEY says that no resolution was passed at the Penang meeting. He did not spring any surprise on anybody. He made an appeal—a "vote of censure" if they would so like to call it. He was talking common sense. If they did not want to do what he wished, the matter ended there. Nobody was disgusted at the remarks he made then. They all seemed to agree that moderation was the best course to adopt in dealing with Government. There was no intention on his part to spring a surprise on any one.

Mr. JEAVONS considers that the discussion had lasted quite long enough and moves that the minutes be passed as circulated.

Mr. BROOKE seconds.

Mr. CUMMINS proposes as an amendment that the whole matter headed "2. Procedure" in the last minutes of the meeting held on 25th November be deleted.

Mr. MURRAY seconds the amendment.

Mr. McCULLOCH supports the amendment. He would have been very pleased to support their Chairman if the remarks had been made in Committee instead of in public. But this general condemnation of the action of the whole of the delegates had undoubtedly given rise to a certain amount of feeling throughout the country. He would have supported his remarks had they been limited to a certain number of delegates, and if these remarks had been confined to the delegates and for their benefit and not for the benefit of the public. The matter had been widely discussed with unfavourable comment on their Association and after all that had passed he saw no alternative but to support Mr. Cummins' amendment—*viz.*, that all the remarks made under that heading be taken out of the minutes of the previous meeting.

Mr. RITCHIE would like to remind that the Chairman's general remarks had not been mainly directed at speeches made but at the tone of the resolutions proposed and he obviously had in his mind the resolution on the question of Export Duty. Those resolutions had been public enough and it was obvious therefore that he had also to speak in public. If the Association favoured violent action rather than moderation he was convinced that they would lose the services of many useful men both as delegates and on the Standing Committee.

Replying to a question, Mr. KINDERSLEY says the Export Duty resolution had been especially in his mind as bringing the whole question to a head.

Mr. MOOIJAART wishes to refer to Mr. Harvey's remarks that the question had indeed been mentioned a few minutes before the termination of one of their Standing Committee Meetings but he does not agree that there had been any proper discussion of the subject by that Committee.

The amendment is then put to the meeting and declared carried by 17 votes against 6.

Mr. BENNETT points out that on p. 18, paragraph 4, certain words had been attributed to him which had actually been made by Col. Fox.

The minutes subject to the amendment carried and the correction moved by Mr. Bennett are then confirmed and signed.

Mr. KINDERSLEY expresses regret at what had happened but of course there was nothing for him now to do but to vacate the chair. He regrets having to do so before his two years of office expired in another two months, but after what had occurred he did not care to remain on. The meeting, he believes, was by no means a representative one but sufficiently so for his purpose and he therefore would now vacate the chair.

Mr. Kindersley then leaves and Mr. HARVEY as Vice-Chairman takes the chair, after enquiring whether there was any objection to his doing so and the meeting's reply being in the negative.

2.—WAR.

The SECRETARY submits the following correspondence and accounts:

"*27th November, 1918.*

"YOUR EXCELLENCY,

"I have the honour to inform Your Excellency that at a General Meeting of this Association held on the 25th inst. I was instructed to forward the following resolution which was carried unanimously—*viz.*: 'This meeting of the Planters' Association of Malaya expresses its earnest desire to His Excellency the Governor of the Straits Settlements and High Commissioner of the Federated Malay States, that no person of German nationality be permitted to engage in trade or to obtain employment in British Malaya for a period of years after the declaration of peace and even then only under licence granted by the Government.'

"I have, etc.,

"(Sd.) H. C. E. ZACHARIAS,
"*Secretary.*

"HIS EXCELLENCY
"SIR ARTHUR YOUNG, G.C.M.G.,
"HIGH COMMISSIONER, FEDERATED MALAY STATES,
"KUALA LUMPUR."

"KUALA LUMPUR,
"FEDERATED MALAY STATES,
"*28th December, 1918.*

"No. 5542/18.

"SIR,

"With reference to your letter dated the 27th November, 1918, addressed to His Excellency the High Commissioner on the subject of a resolution carried unanimously at a General Meeting of the Planters' Association of Malaya held on the 25th November, 1918, regarding the admission of Germans into British Malaya, I am directed to inform you that His Excellency has caused the views of your Association to be made known by telegram to the Secretary of State for the Colonies.

"I have, etc.,

"(Sd.) M. S. H. MCARTHUR,
"*Under Secretary to Government, F.M.S.*

"THE SECRETARY,
"PLANTERS' ASSOCIATION OF MALAYA,
"KUALA LUMPUR."

"*29th November, 1918.*

"SIR,

"At the last General Meeting of this Association held on the 25th inst. expression was given to the current belief that a great number of men from Australia is contemplating emigration to this country with a view to taking up employment on rubber estates.

"The impression appears to be widespread in Australia that there are many vacancies in the Malayan Rubber Industry, but as such is by no means the case. persons arriving here unless they had been definitely appointed before leaving Australia would find themselves in a very difficult position.

"The Association have therefore instructed me to cable to you as per confirmation attached in the hope that a warning issued by you may prevent unnecessary hardship to numbers of men who may be under an erroneous impression regarding their prospects in this country.

"I have, etc.,

"(Sd.) H. C. E. ZACHARIAS,
"*Secretary.*

"THE HON'BLE
"THE MINISTER FOR HOME AFFAIRS,
"MELBOURNE."

Copy of cable sent by Secretary, Planters' Association of Malaya, Kuala Lumpur, F.M.S., on 27th November, 1918, to Minister for Home Affairs, Australia, Melbourne.

"MINISTER, HOME AFFAIRS, MELBOURNE,

"Afraid wrong impression *re* prospects employment on rubber plantations Malaya please dissuade men coming here without definite appointment.

"PLANTERS' ASSOCIATION OF MALAYA."

COMMONWEALTH OF AUSTRALIA.

"HOME AND TERRITORIES DEPARTMENT,
61, SPRING STREET,
"MELBOURNE,
"*29th November, 1918.*

"I am directed by the Minister for Home and Territories to acknowledge the receipt of your cablegram, dated 27th November, in the following terms:

'Afraid wrong impression *re* prospects employment on rubber plantations Malaya please dissuade men coming here without definite appointment'

and to inform you that a notice has been issued in the press of Australia warning men against going to Malay States on the chance of obtaining employment. In addition instructions have been given to the passport authorities to notify applicants for passports to the same effect.

"(Sd.) A. HUNT,
"*Secretary.*

"THE CHAIRMAN,
"PLANTERS' ASSOCIATION OF MALAYA,
"KUALA LUMPUR,
"FEDERATED MALAY STATES."

"*29th November, 1918.*

"DEAR SIR,

"At the last General Meeting of the Association held on the 25th inst. I was instructed to send you a cable, (copy of which I beg to enclose) which is self-explanatory.

"Believe me, etc.,

"(Sd.) H. C. E. ZACHARIAS,

"*Secretary.*

"SIR WILLIAM TAYLOR, K.C.M.G.,
"MALAY STATES INFORMATION AGENCY,
"88, CANNON STREET,
"LONDON, E.C. 4."

Copy of cable sent by Secretary, Planters' Association of Malaya, Kuala Lumpur, on 27th November, 1918, to Malay States Information Agency, 88, Cannon Street, London, E.C.4.

"MILWAKIL, CANNON, LONDON,

"Planters' Association General Meeting request you issue warning against prospective planters proceeding Malaya without definite appointments pre-war standard European supervision no criterion present requirements refer Rubber Growers especially regarding previous correspondence living wage.

"ZACHARIAS."

WAR RELIEF.

"*4th December, 1918.*

"DEAR SIR,

"At the last meeting of this Association, the future of this Fund was discussed in view of the approaching peace and I was instructed to ask whether you could kindly give us an idea what capital sum we ought to aim at as it is proposed to close this Fund as soon as it is finally known what total liabilities by way of annuities, etc., the Fund will be called upon to meet.

"Believe me, etc.,

"(Sd.) H. C. E. ZACHARIAS,

"*Secretary.*

"SIR WILLIAM TAYLOR, K.C.M.G.,
"MALAY STATES INFORMATION AGENCY,
"88, CANNON STREET,
"LONDON, E.C. 4."

PLANTERS' WAR RELIEF FUND OF MALAYA.

Subscriptions received up to 28th January, 1919.

	$ c.	$ c.
Batang Padang, D.P.A.		
	790.00	
Davidson, R. ...	30.00	
		820.00
Batu Tiga, D.P.A.		
Balloch, R. B. ...	40.00	
Bell, C.	225.00	
Bennett, G. H. ...	225.00	
Bragg, W. H. ...	180.00	
Chalmers, A. P. ...	135.00	
Crush, C. N. ...	80.00	
Cumming, T. J. ...	225.00	
Davidson, A. ...	90.00	
Davidson, D. C. K. ...	200.00	
Finkleston, G. ...	15.00	
Gilman, M. A. P. ...	90.00	
Glenmarie Estate Staff	140.00	
Johns, E. D.	60.00	
McNeill, F.	90.00	
Nixon, R.	50.00	
Ord, J. G.	40.00	
Orr, H. Douglas ...	135.00	
O'Malley, F. B. ...	90.00	
Robertson, J. A. ...	90.00	
Sansom, P. N. ...	45.00	
Spooner, A. F. ...	60.00	
Tucker, W. S. Reeve	90.00	
Webb, C. M. ...	45.00	
Will, R. W.	72.00	
Williamson, J. ...	90.00	
		2,602.00
Central Pahang, P.A.		
Birkemose, F. ...	100.00	
McVitie, D. D. ...	75.00	
Sungei Bilut Estate	90.00	
Williams, P. J. A. ...	218.70	
Willis, E. J. ...	135.00	
		618.70
Central Perak, P.A.	2,228.00	
Caldwell, W. J. ...	160.00	
Jonklaas, W. O. ...	180.00	
Robins, N.	45.00	
Wilson, T. K. ...	135.00	
		2,748.00
Carried forward ...		6,788.70

	$ c.	$ c.
Brought forward		6,788.70
Johore, P.A.		
Adamson, H. ...	60.00	
Anker, E.	30.00	
Batu Anam Club ...	484.00	
Becker, F. E.	30.00	
Bell, C. E.	40.00	
Bolton, G. V. ...	282.00	
Bradbery, C. ...	100.00	
Bradburne, C. W. ...	100.00	
Cox, C. N.	50.00	
Cummins, H. ...	30.25	
Creighton, R. G. ...	60.00	
Dawson, G.	10.00	
Gawler, W. N. ...	50.00	
Gilfillan, W.	12.00	
Gomali Club... ...	108.00	
Innes, A.	10.00	
Jessen, G.	87.00	
Kluang Estate ...	120.00	
Lanadron Estate Staff	100.00	
Le Doux, J. S. ...	25.00	
Mengkibol Estate ...	25.00	
Mersing Estate Staff	35.00	
Monson, J. H. ...	50.00	
Muar River Estate Staff	323.00	
Nordanal River Estate Staff	350.00	
Permas River Estate Staff	120.00	
Ramsay, H. H. ...	30.00	
Robertson, A. W. ...	50.00	
Ross, D. A.	319.95	
Segamat Estate Staff	175.00	
Smith, St. Alban ...	50.00	
Spencer, C. H. ...	50.00	
Spencer, E. S. ...	100.00	
Sungei Dangar Estate Staff	65.00	
Tebrau Estate Staff	458.50	
Tinker, A.	50.00	
		4,039.70
Kajang, D.P.A.	455.00	
Beaty, C.	80.00	
Biggin, B.	80.00	
Clerk, G. P.	180.00	
Cummins, E. N. T. ...	225.00	
Dakeyne, O. P. ...	225.00	
Carried forward ...		10,828.40

	$ c.	$ c.
Brought forward		10,828.40
KAJANG, D.P.A. —(*cont.*)		
Ferrers, C. R. ...	180.00	
Fowler, H. O. ...	128.50	
Hickson, G. L. O'Hara	180.00	
Kinder, C.	70.00	
Kindersley, the Hon'ble R. C. M.	225.00	
Mactaggart, R. K. ...	63.00	
Mesney, R. F. ...	135.00	
Miller, C. H. ...	10.00	
Moullin, H. R. ...	225.00	
Paul, C.	40.00	
Pinhorn, P. R. ...	30.00	
Schwabe, E. M. ...	180.00	
Solbe, H. E. G. ...	350.00	
Sparshott, H. C. ...	30.00	
Tyler, E. W.... ...	60.00	
Wiggins, T. G. ...	10.00	
		3,161.50
KAPAR, D.P.A.		
Armstrong, F. E. J.	40.00	
Fisher, N.	240.00	
Gray, F. E. A. ...	80.00	
Mooijaart, L. ...	180.00	
O'Brien, W. L. R. ...	225.00	
Pratt, J. C.	81.00	
Stonehewer, R. S. ...	153.00	
Tedlie, T. H. ...	80.00	
		1,079.00
KELANTAN, P.A.		
Anderson, W. G. ...	225.00	
Archer, L. D. ...	135.00	
Taylor, A. N. ...	90.00	
		450.00
KLANG, D.P.A.	380.00	
Ayer Hitam Planting Syndicate	1,000.00	
Battiscombe, R. B. ...	70.00	
Biddlecombe, H. T. A.	108.00	
Buxton, C. A. ...	140.00	
Greenhill, R. D. ...	225.00	
Gulland, D. L. ...	90.00	
Hardingham, H. P....	175.00	
Hendrie, R. Napier ...	160.00	
Latimer, T. M. ...	80.00	
Maguire, C.	90.00	
Midlands Estate ...	97.00	
Prior, E. B.	135.00	
Quartley, H. R. ...	675.00	
Roberts, C. L. ...	90.00	
Carried forward ...		15,518.90

	$ c.	$ c.
Brought forward ...		15,518.90
KLANG, D.P.A. —(*cont.*)		
Smith, C. Hammond	225.00	
Trollope, F. A. ...	75.00	
Wakefield, E. C. ...	120.00	
		3,935.00
KUALA LANGAT, D.P.A. ...	675.19	
Irvine, H. C. d'Arcy...	135.00	
Lendrum, J. B. ...	135.00	
Mann, J. P.	90.00	
Munro, R. W. ...	180.00	
Symons, G. O. W. ...	80.00	
		1,295.19
KUALA LUMPUR, D.P.A. ...	278.84	
Armstrong, H. ...	225.00	
Barnet, G. P. ...	225.00	
Campbell, F. M. ...	225.00	
Coppens, P.	100.00	
Douglas, J. B. ...	166.50	
Farrell, M.	60.00	
Fox, Lt.-Col. A. J. ...	160.00	
Fraser, W. D. ...	200.00	
Gardner, D. S. ...	273.00	
Harvey, F. G. ...	180.00	
Harvey, T. R. ...	90.00	
Jeavons, F. C. ...	100.00	
Laddell, R. G. ...	180.00	
Luschwitz, T. H. ...	40.00	
Neilson, James ...	44.00	
McCrow, D. W. ...	90.00	
Quaife, Dr. W. T. ...	25.00	
Smith, M. Sharpe ...	231.39	
Wilkinson, H. B. ...	180.00	
Zacharias, H. C. E....	135.00	
		3,208.73
KUALA SELANGOR, D.P.A.		
Brown, T. L. ...	90.00	
Estrange, G. R. L. ...	80.00	
Fesq, E. W.	200.00	
Gordon, W. M. ...	153.00	
Irving, L. A. ...	270.00	
Laporte, E.W. ...	30.00	
More, Thomas ...	200.00	
Ransom, R. H. ...	25.00	
Quinton, L. M. ...	30.00	
Stevens, T. L. ...	180.00	
E. D. M. K. K. ...	360.00	
		1,618.00
Carried forward ...		25,573.82

	$ c.	$ c.
Brought forward ...		
LOWER PERAK, P.A.		25,573.82
Bayley, H.	135.00	
Bayley, R. G. ...	252.00	
Brodie, T.	120.00	
Bryant, G. W. ...	218.05	
Carmichael, D. ...	60.00	
Cruickshank, E. J. ...	10.00	
Dell, W.	80.00	
Dodgson, R. H. ...	90.00	
Dukes, M. B.	40.00	
Evans, R. C.... ...	70.00	
Hartley, M. R. ...	40.00	
McLeod, R. A. ...	160.00	
Park, H. H.	39.00	
Phillips, R. H. ...	80.00	
Pickering, J. T. ...	20.00	
Pratt, F. T. B. ...	15.00	
Ratanui Estate Staff	318.89	
Sabrang „ „	425.00	
Selaba „ „	215.00	
Symes, A. B. ...	150 00	
Tobutt, K.	90.00	
Wilson, R. J. ...	20.00	
		2,647.94
M. P. A. A.		
Alor Pongsu and Brieh Estates ...	65.00	
Baber, E.	135.00	
Bukit Mertajam Estate	391.00	
Carless, H. G. ...	108.00	
Chersonese Estate ...	702.72	
Darke, A. E. G. ...	180.00	
Gula Kalumpang Estates	728.00	
Hargreaves, J. ...	90.00	
Josselyn, E. W. ...	180.00	
Mackay, C. H. ...	54.00	
Mallett, N. W. ...	100.00	
Rasmussen, H. G. ...	100.00	
Rickeard, H. W. ...	180.00	
Sherwood, B. ...	168.00	
		3,181.72
NEGRI SEMBILAN, P.A.	870.00	
Adair, H.	135.00	
Adames, T. Slade ...	40.00	
Burgess, I.	188.00	
Clarkson, S. W. ...	90.00	
Carried forward ...		31,405.48

	$ c.	$ c.
Brought forward ...		
NEGRI SEMBILAN, P.A. —(*cont.*)		31,405.48
Crawford, W. P. ...	45.00	
Cuthbertson, T. F. ...	40.00	
Fenton, R. D. ...	180.00	
Foster, M. R. ...	20.00	
Grant, G.	180.00	
Handover, W. P. ...	90.00	
Hanmer, H. R. ...	98.00	
Hay, J. B.	76.50	
Hearn, A. J. ...	90.00	
Heherr, F. J. ...	135.00	
Hingston, G. W. ...	100.00	
King, H. W. F. ...	135.00	
Mansfield, L. ...	28.00	
Maycock, R. M. A. ...	90.00	
Mills, E. G.	900.00	
Mills, G. R.	12.00	
Paterson, A. F. ...	150.00	
Ritchie, C.	135.00	
Reynolds, K. P. ...	180.00	
Sepang Valley Estate	500.00	
Smith, E. E. ...	180.00	
Swinton, C. H. ...	180.00	
Tayler, V. A. ...	450.00	
Watt, Wm.	90.00	
A Pound of Flesh ...	10.00	
		5,417.50
TAIPING, P.A.	508.50	
Bruas Estate ...	110.00	
Croal, T. Gordon ...	130.00	
Grant, G. A.... ...	180.00	
Jameson, A. C. ...	80.00	
Moraes, H. F. ...	90.00	
Perera, C.	45.00	
Ritchie, C.	75.00	
Tate & Co.	150.00	
Willis, A.	90.00	
		1,458.50
ULU SELANGOR, D.P.A.	538.25	
Brunton, R.... ...	100.00	
Coe, P. F.	90.00	
Dakeyne, N. H. ...	135.00	
Fallon, M. D. ...	180.00	
Fleming, D. J. ...	63.00	
Hastings, P. E. ...	30.00	
Kennaway, M. J. ...	225.00	
Kennedy, W. C. ...	92.25	
		1,453.50
R. W. Fox-Male		100.00
Grand Total ...		39,834.98

THE FEDERATED MALAY STATES WAR RELIEF FUND AND SCHEME No. 2. STATEMENT OF ACCOUNT, 1st JULY TO 30th SEPTEMBER, 1918.

Receipts.	Amount. £ s. d.
Balance from last account...	30,113 8 0
Remittances from the Planters' Association of Malaya	1,500 0 0
Contributions and Donations received through the Rubber Growers' Association	1,026 8 2
The Consolidated Malay Rubber Estates, Limited, Donation	100 0 0
The Tronoh Mines, Limited, Donation	125 0 0
Interest on Investments	42 0 0
	32,906 16 2

Payments.		Amount. £ s. d.
Grants and gratuities:	£ s. d.	
Mr. ——	50 0 0	
,, ——	30 0 0	
,, ——	30 0 0	
,, ——	20 0 0	
,, ——	15 0 0	
,, ——	20 0 0	
,, ——	25 0 0	
,, ——	9 0 0	
,, ——	15 0 0	
,, ——	1 10 0	
,, ——	100 0 0	
,, ——	50 0 0	
		365 10 0
		32,541 6 2
Balance in hand		32,906 16 2

The balance of £32,541 6s. 2d. is disposed as under:	£ s. d.	£ s. d.
Five per cent. War Loan (£12,000) at cost ...		11,400 0 0
Six per cent. Exchequer Bonds		2,000 0 0
Five per cent. National War Bonds...		16,000 0 0
Deposit in Chartered Bank of India, etc.		1,000 0 0
Balance of current account in Chartered Bank	1,824 9 5	
Less outstanding cheques	183 0 0	
		1,641 9 5
Cheque in transit-credited 1-10-18		500 0 0
		32,541 9 5
Due to Treasurer ...		3 3
		32,541 6 2

(Sd.) W. T. Taylor.

I hereby certify that I have audited the above statement of receipts and payments with the book and vouchers of the Fund and find the same to be correct. The grants have all been authorized by the Committee.

(Sd.) A. H. Cullen,
Chartered Accountant,
Honorary Auditor

73, Basinghall Street, E.C.,
12th October, 1918.

Copy of cable received from London on 4th December, 1918.

"Eighteen centres have been asked for army of occupation Germany shall we include Cumming's memorial temporary also permanent institute English garrison later.

"BAXENDALE.

"ZACHARIAS,

"SINGAPORE DIOCESAN ASSOCIATION,

"KUALA LUMPUR."

Copy of cable sent by Secretary, Planters' Association of Malaya, Kuala Lumpur, on 5th December, 1918, to Baxendale, Battleaxe, London.

"Quite agree your suggestion *re* Cumming memorial remitted to-day three hundred fifty-seven pounds total collected to date.

"ZACHARIAS."

"THE CHURCH ARMY,
"NAVAL AND MILITARY DEPARTMENT,
"55, BRYANSTON STREET,
"LONDON, W. 1,
"*28th November, 1918.*

"DEAR SIR,

"We sent you the following cable on November 25th:

> 'Eighteen centres have been asked for army of occupation Germany shall we include Cumming's memorial temporary also permanent institute English garrison later. Baxendale.'

"The Military Authorities have impressed our Committee with the importance of carrying on our work during the period of demobilization and we have been requested to provide centres for our army of occupation in Germany—*viz.*, Cologne and Coblenz. According to the press reports, the Planters' Association of Malaya proposed to raise funds for a memorial to our late Chief Commissioner, Malcolm Cumming, and this was to take the form of a Church Army Hut. We, therefore, thought you would like to have a suggestion as to how the money might be worthily applied.

"In Germany we shall probably occupy and equip buildings which the Army will find for us; but if the Cumming Fund is sufficient for the purpose, we should like to erect a more lasting memorial to our old friend in the shape of a soldiers' institute in one or other of the permanent military towns in this country.

"You will, I feel sure, appreciate our difficulty in arranging allocations and reporting on the working of our centres at the present time. We have been sending canvas huts up to the Line as fast as the makers can supply them, but with the armies

advancing every day, taking our huts along with them, it has been impossible for our Commissioner to send us any detailed reports. With grateful thanks to all your subscribers for their generous support.

"Believe me, etc.,

"(Sd.) C. BAKENDALE.

"H. C. E. ZACHARIAS, ESQ.,
"SECRETARY,
"SINGAPORE DIOCESAN ASSOCIATION,
"KUALA LUMPUR."

CHURCH ARMY—MALCOLM CUMMING MEMORIAL TENT.

F. G. Harvey	$ 50.00
Gedong Estate	21.88
Bukit Tambun Estates, Ltd.	75.00
H. F. Cardwell	5.00
Sungei Sayong Estate	10.00
Kota Tinggi Estate	5.34
C. G. Renshaw	10.00
Collected by F. A. Wright, Esq.	2,560.00
Rantau Club	250.00
J. W. B. Walker	25.00
F. Hunt	10.00
W. H. Wallace	15.00
Atherton Estate	6.02
Jendarata Estate	20.00
Bernam Estate	5.66
R. L. Corbett	7.00
Ainsdale Estate	3.65
New Labu...	5.90
Temiang South	85.71
	$3,171.16
Remitted £357 ... ... = $3,046.40	
Cost of message 11.07	
	3,057.47
In hand ...	$ 113.69

The SECRETARY explains in connection with the Malcolm Cumming Memorial Fund that as they would see from the accounts submitted, the bulk of the subscriptions had come from Negri Sembilan who in fact had collected the full cost of a tent—viz., $2,560 and even of the balance of $611.16 the bulk had come from subscribers in Negri Sembilan. He hopes that, if subscriptions from the other parts of the Peninsula were still to come in, they would be sending them in promptly before the end of their financial year, i.e., on 31st March.

Mr. MURRAY does not think that the funds collected were spent fast enough ; as they saw there were large capital accumulations.

Mr. HARVEY points out that this capital was needed to provide annuities, but all the same he did not think that any application to the fund had ever been refused.

Mr. FERGUSON doubts whether all the eligible men had availed themselves of the fund. He thinks every man who had gone from here should be paid a bonus from the fund for the financial loss which his military service had entailed.

Mr RITCHIE points out that they had already asked Sir William Taylor to let them know how matters stood and as soon as all cases were known annuities would be granted (and it must be remembered in this connection that the fund was intended also to cover the cost of educating children) and when it came to pay annuities it would be found that their capital fund was by no means too large.

3.—QUARANTINE.

The SECRETARY submits the following correspondence :

"*4th December, 1918.*

"SIR,

"I have the honour to inform you that at the last General Meeting of this Association it was resolved to submit that a number of visitors be appointed to the Penang Quarantine Station in the same manner as is now done at Port Swettenham.

"I have, etc.,

"(Sd.) H. C. E. ZACHARIAS,
"*Secretary.*

'THE HONOURABLE
"THE COLONIAL SECRETARY,
"STRAITS SETTLEMENTS,
"SINGAPORE."

M.T. "COLONIAL SECRETARY'S OFFICE,
"SINGAPORE,
"*7th December, 1918.*

"No. 10704/18.

"SIR,

"I am directed to acknowledge the receipt of your letter of the 4th December, 1918, stating that at the last General Meeting of your Association it was resolved to submit that a number of visitors be appointed to the Penang Quarantine Station in the same manner as is now done at Port Swettenham.

"I have, etc.,

"(Sd.) R. CRICHTON,
"*for Colonial Secretary,*
"*Straits Settlements.*

"THE SECRETARY,
"THE PLANTERS' ASSOCIATION OF MALAYA,
"KUALA LUMPUR."

"*5th December, 1918.*

"SIR,

"I have the honour to inform you that a recent outbreak of cholera at Telok Anson was discussed at the last General Meeting of this Association held on the 25th ult. The facts of the case were stated by Dr. Giddy and I beg to attach press cutting of his speech for your information.

"After full discussion of the subject, it was resolved to enquire of you into the non-notification of those concerned of the cholera-infected ships and to submit that a thorough inquiry be held in the matter to ensure more efficient safeguard against the introduction of cholera.

"I have, etc.,

"(Sd.) H. C. E. ZACHARIAS,

"*Secretary*

"UNDER SECRETARY,

"FEDERATED MALAY STATES,

"KUALA LUMPUR."

"*5th December, 1918.*

"SIR,

"I have the honour to enclose for your information copy of a letter addressed by me to-day to the Under Secretary on the subject of an outbreak of cholera at Telok Anson.

"I have, etc.,

"(Sd.) H. C. E. ZACHARIAS,

"*Secretary.*

"CHAIRMAN,

"INDIAN IMMIGRATION COMMITTEE,

"KUALA LUMPUR."

"CONTROLLER OF LABOUR, F.M.S.,

"KUALA LUMPUR,

"*5th December, 1918.*

"SIR,

"I have the honour to acknowledge with thanks the receipt of your letter of date enclosing a copy of your letter of same date to the Under Secretary on the subject of an outbreak of cholera at Telok Anson.

"I have, etc.,

"(Sd.) J. R. O. ALDWORTH,

"*Controller of Labour, F.M.S.*

"THE SECRETARY,

"PLANTERS' ASSOCIATION OF MALAYA,

"KUALA LUMPUR."

"Federal Secretariat,
"Kuala Lumpur,
"*10th December, 1918.*

"No. 5619/18.

"SUBJECT:

"Outbreak of Cholera at Telok Anson.

"Sir,

"I have the honour to acknowledge the receipt of your letter of the 5th December, 1918, the contents of which are receiving attention.

"I have, etc.,

"(Sd.) C. C. Brown,
"*for Under Secretary to Government, F.M.S.*

"The Secretary,
"Planters' Association of Malaya,
"Kuala Lumpur."

Mr. McCulloch reports the case of a neighbouring estate, of which seven coolies had escaped from the Quarantine Station in Port Swettenham although they were cholera contacts.

Mr. Bennett says he had recently had a gang of coolies in the camp at Port Swettenham, of whom two had bolted and three had been bought out in the camp. No watchman had been punished.

Mr. Tayler thinks that the whole question ought to be brought up. Isolated cases were considered at every meeting, but he thinks that a special Committee should be appointed to deal with the whole matter.

Mr. Mooijaart points out that Dr. Brooke had given his opinion on the Quarantine Memorandum prepared by Dr. Day and himself and he deprecates taking any further action until that report had been made available to this Association.

Mr. Tayler withdraws his suggestion after what Mr. Mooijaart had said.

Mr. Harvey suggests that the Under Secretary be asked for a copy of Dr. Brooke's report which they understood had already been published in the Colony.

This is agreed to, and the Secretary is instructed accordingly.

Mr. Ferguson comments on the fact that no reply had been received yet in the matter of the Penang Camp.

Mr. Harvey enquires whether the meeting wished to instruct the Secretary to forward the particulars of the case given by Mr. McCulloch to the Principal Medical Officer.

This is agreed to.

4.—INDIAN LABOUR.

The SECRETARY submits the following correspondence :

"*5th December, 1918.*

"SIR,

"I have the honour to acknowledge receipt of your letter No. 4/578 dated 25th November and memorandum all of which were duly considered at a General Meeting of my Association held that day. After considerable discussion, the following resolution was carried unanimously—*viz.*: 'That applications for Recruiting Licences be made to the Assistant Controllers of Labour and, if approved and endorsed by them, should be accepted by the Deputy Controller of Labour in Penang.'

"Trusting that it will be possible for the Government of India and your own Department to adopt this procedure,

"I have, etc.,

"(Sd.) H. C. E. ZACHARIAS,

"*Secretary.*

"E. W. F. GILMAN, ESQ.,

"SECRETARY,

"INDIAN IMMIGRATION COMMITTEE,

"PENANG."

"*13th December, 1918.*

"SIR,

"I have the honour to confirm the resolution which was unanimously carried at the meeting of the Standing Committee held yesterday which you kindly attended: 'That in view of the large requirements of labour in 1919, this Committee consider that all restrictions in respect of age and for passports be removed and that adequate shipping be provided to bring over at least 150,000 persons and that the Controller of Labour be asked kindly to support this request and to enlist the High Commissioner's good offices with the Indian Government in the matter.'

"As you are aware instructions have been received for most properties to start unrestricted tapping as from January next in which case large areas of 1913, 1914, 1915 clearings will come into bearing quite apart from the removal of the existing voluntary restrictions in production.

"In the meantime and if it is not possible to make the necessary arrangements to carry out the above suggestions, the Committee submit that the Indian Government should issue a licence for at least the same number of emigrants as was given this year, *i.e.*, 73,000.

"I have, etc.,

"(Sd.) H. C. E. ZACHARIAS,

"*Secretary.*

"CONTROLLER OF LABOUR, F.M.S.,

"KUALA LUMPUR."

"LABOUR OFFICE,
"PENANG,
"*2nd January, 1919.*

"No. I.I.C. (Misc.) 518/18.

"SIR,

"With reference to your letter dated 5th December, 1918, transmitting a resolution of the last General Meeting of the Planters' Association of Malaya in the following words:

> 'That applications for Recruiting Licences be made to the Assistant Controllers of Labour and, if approved and endorsed by them, should be accepted by the Deputy Controller of Labour in Penang.'

"I have the honour to inform you that there appears to be no objection to the adoption as an experiment of the alternative procedure set out below, which it appears to the Chairman of the Indian Immigration Committee will satisfy the terms of the resolution.

(*a*) Employers desirous of sending a kangany to India may send the kangany to the local Labour Office with a licence form duly filled up. It will be necessary for the Deputy or Assistant Controllers of Labour personally to examine the kangany and to make such enquiries as may seem necessary. If the kangany satisfies the Labour Officer that he is a *bona fide* agricultural labourer and over 25 years of age the Labour Officer will send the licence to the Deputy Controller of Labour, Penang, with the recommendation that it be registered and will give to the kangany a note to the estate manager stating that he has done so.

(*b*) The Deputy Controller of Labour, Penang, will on receipt of the licence, look up the licensee's record, if any, and, if all appears in order, will register the licence and return it by post direct to the employer.

(*c*) The employer will then hand the licence to the kangany with instructions that he should not part with the licence to any one on the voyage, but should, on landing in India, take the licence straight to the Emigration Agent at Madras or Negapatam for registration in his office. It will not be necessary for the kangany to land at Penang.

"2. While it is hoped that this procedure will prove for employers in Selangor and Negri Sembilan a convenient alternative to the procedure now in force, it must be pointed out that the time occupied in obtaining a licence will sometimes be considerable. The Deputy or Assistant Controllers of Labour are frequently absent from their offices for periods of several days at a time; employers are therefore advised to send the kangany to the local Labour Office from two to three weeks before the proposed date of sailing from Port Swettenham of the kangany.

"Even then disappointments are bound to occur. Owing to the fact that kanganies are not examined personally at the Penang Office, where they are best known, it is inevitable that a few undesirable men should receive licences at this side. These men will probably be detected at Madras and Negapatam and their licences will be cancelled there. Employers are warned of the inconveniences inseparable from the procedure now approved as an alternative.

"I have, etc.,

"(Sd.) E. W. F. GILMAN,

"*Secretary,*

"*Indian Immigration Committee.*

"THE SECRETARY,

"PLANTERS' ASSOCIATION OF MALAYA,

"KUALA LUMPUR."

"*8th January, 1919.*

"SIR,

"I have the honour to acknowledge receipt of your letter 518 of the 2nd instant which has been considered by my Standing Committee at their meeting held yesterday.

"In reply I am to say that my Committee welcome the alternative procedure authorized and consider that the great conveniences thereby afforded by far outweigh the small drawbacks mentioned by you.

"In view of the unpopularity of the present system my Committee hopes that you will treat this matter as urgent and bring the new system into force as soon as possible and certainly before the end of this month.

"My Committee will recommend planters to adopt the following procedure in future:

"The employer will, as soon as he receives the licence, hand same to the kangany in a sealed envelope addressed to his agents in India whom he will instruct to see that the licence is registered at the Emigration Agency. It is important that the licence should not leave the possession of the kangany, and by the suggested procedure it is confidently expected that occasions for corruption will be very considerably reduced.

"I have, etc.,

"(Sd.) H. C. E. ZACHARIAS,

"*Secretary.*

"E. W. F. GILMAN, ESQ.,

"SECRETARY,

"INDIAN IMMIGRATION COMMITTEE,

"PENANG."

"Labour Office,
"Penang,
"No. 13 in I. I. C. "*15th January, 1919.*
"Misc. 578/18.

"Sir,

"I have the honour to acknowledge receipt of your letter of the 8th instant and to inform you that steps are being taken to bring the new procedure for the issue of kangany licences into force at once.

"2. With regard to the 4th para. of your letter I have to warn you that the procedure you propose to recommend to planters is open to serious legal objections. The carrying of the licence in a sealed envelope would appear to be an offence both against the Post Office Ordinance (V of 1904) and against the (War) Post Office Ordinance XIV of 1915.

"Further I understand that the passport examining officers come on board in India and require to see the licences. I would suggest therefore the advisability of the licences being carried in open envelopes as at present.

"I have, etc.,
"(Sd.) E. W. F. Gilman,
"*Secy., Indian Immigration Committee.*

"To
"The Secretary,
"Planters' Association of Malaya,
"Kuala Lumpur."

"No. 321/1918.

"Office of the Controller of Labour,
"Kuala Lumpur,
"*25th November, 1918.*

"Sir,

"I have the honour to inform you that the subject of the encouragement of so-called voluntary immigration, that is to say, the immigration of labourers who have not been recruited by a kangany, was considered at a meeting of the Indian Immigration which was held on the 4th November current.

"Various suggestions which had been made to me, and regarding which I had consulted with the Emigration Agents in India, were considered. It was decided that, while the Committee is sympathetic to the idea of increasing voluntary immigration, it is not in favour of altering the present system; the Committee think that much wider use might be made of the printed notices informing returning emigrants who are *bona fide* labourers that they can obtain free passages for themselves and their families from India to Malaya, and I undertook to bring the subject to the notice of employers.

"In the year 1913 and again in October, 1916, at the request of the Indian Immigration Committee I wrote to every employer of Indian labourers Tamil and or Telugu notices, as the case seemed to require, with an English translation and a request that they might be

posted in a conspicuous position in all cooly lines. At the same time a quantity of notices in four languages was prepared in a handy form to be carried on the labourer's person. It rests with individual employers to bring to the notice of labourers about to return to India the fact that they can obtain free tickets on application to the Government Emigration Office at Madras or Negapatam (not to the B. I. Agents) and that the process may be facilitated if they carry with them a copy of the notice, which can be obtained at any Labour Office in this country or from the Travelling Inspector on board any of the contract steamers returning to India.

"It should be borne in mind that it is contrary to the interests of kanganies generally that returning labourers should carry these notices with them.

"The two attempts made from this office to induce employers to popularize 'voluntary' emigration having met with but little success. I am addressing you in the hopes that the Standing Committee of your Association may be more successful in bringing home to the employers of Indian labour the very great advantages that would accrue if a much larger flow of 'voluntary' labourers to this country were assured.

"It may be not out of place to mention that the number of 'voluntary' immigrants has gradually increased from 2,187 in 1911 to 6,691 in 1917.

"Samples are enclosed of the Tamil and Telugu notices for posting in the lines, and of the English translation as well as of the small notice in four languages which is intended to be carried by the labourer when returning to India. All these documents are stocked by the Department and can be obtained on application at any Labour Office in the Federated Malay States or Straits Settlements.

"I have, etc.,

"(Sd.) J. R O. ALDWORTH,
"*Controller of Labour, F.M.S.*

"THE SECRETARY,
"PLANTERS' ASSOCIATION OF MALAYA,
"KUALA LUMPUR."

"OFFICE OF THE CONTROLLER OF LABOUR,
"KUALA LUMPUR,
"*16th December, 1918.*

"No. 268/17.

"SIR,

"I have the honour to inform you that Enactment No. 22 of 1918, of which the Bill was published in the *Gazette* of 18th June, 1918, is to be brought into force in the Federated Malay States by publication in the *Gazette* on the 1st January, 1919.

"2. The Enactment amends section 66 of the Federated Malay States Labour Code, 1912, and section 2 is as follows:

> 'Section 66 of the principal Enactment is amended by inserting in sub-section (i), next after the words 'a fee of one dollar' in line 10, the words 'in respect of each labourer named in such statement.'

"3. I have consulted the Legal Adviser regarding the liability for payment of the enhanced fee in respect of labourers engaged during the last days of December whose names are included in a statement received at the beginning of January and he advises that the amount of the fee will be determined by the date upon which the statement is presented in person at the Labour Office or forwarded to the Labour Office, not by the date upon which the labourer is engaged.

"4. Employers are therefore advised to forward statements upon the 31st December with a fee of one dollar. With all statements forwarded after that date a fee of one dollar in respect of each labourer named in such statement will have to be forwarded.

"I have, etc.,

"(Sd.) J. R. O. ALDWORTH,

"*Controller of Labour, F.M.S.*

"THE SECRETARY,

"PLANTERS' ASSOCIATION OF MALAYA,

"KUALA LUMPUR."

"*P.S.*—The enclosed advertisement will appear in the *Malay Mail* and the *Times of Malaya* during the last few days of December. Perhaps after it has appeared once or twice you might think it worth while addressing a letter to the Editors for publication. It is important that no employers of Indian labour in the Federated Malay States should overlook the exact date."

NOTICE.

AMENDMENT OF SECTION 66 OF THE LABOUR CODE, 1912.

"EMPLOYERS OF INDIAN LABOUR

are informed that Federated Malay States Enactment No. 22 of 1918 is to be brought into force by publication in the *Gazette* on the 1st day of January, 1919. This Enactment amends section 66 of the Labour Code by inserting in sub-section (i), next after the words 'a fee of one dollar' in line 10, the words 'in respect of each labourer named in such statement.'

"Employers are advised *to forward on the 31st December* statements of all labourers engaged up to that date with a fee of one dollar. With all statements forwarded *on or after the 1st January* a fee of one dollar in respect of each labourer will have to be forwarded.

"(Sd.) J. R. O. ALDWORTH,

"*Chairman,*

"*Indian Immigration Committee,*

"*Federated Malay States.*"

Mr. Harvey says it was satisfactory to find that their representations in connection with kangany licences had been met. As regards the point raised in Mr. Gilman's last letter, in view of the Censorship regulations, it would be necessary for planters to put licences in unsealed envelopes.

Mr. Cumming enquires whether more licences would be available. He does not consider the present system satisfactory under which licences were issued. He would therefore propose on behalf of the Batu Tiga District Planters' Association that the Indian Immigration Committee be asked to reconsider the restriction of recruiting, and if restriction is still necessary to limit the number of coolies to each estate in proportion to requirements instead of cutting down the number of licences.

Mr. Bennett seconds the proposal and says the guiding idea should be that the man who had been unlucky in his recruiting during the past two years should not be penalized but that he should receive licences in accordance with his requirements. At present, apparently, any number of licences was issued but the total number of coolies which they could recruit under these licences was strictly limited with the result that when that number had been reached, the other recruiting licences became useless.

Mr. Harvey explains that this method had been adopted in order to make kanganies to bring over the total number of coolies mentioned in their licences. Of course there was no reason why the Indian Immigration Committee should not discuss the alternative which was now proposed and he therefore would put Mr. Cumming's proposal as seconded by Mr. Bennett.

The proposal is carried unanimously.

Mr. Tayler thinks that the Indian Immigration Committee ought to circularize all estates as to what their requirements were.

Mr. Bailey says that this had already been done and that the Labour Department possessed that information.

Mr. McCulloch asks whether it would not be well to approach Government again with a request to insert a labour clause on grants of areas of land. The Land Office books would probably be soon opened again and with the present great labour shortage, rates would go up further still if there was no restriction placed on the opening up of large new areas. The labour clause in question of course would stipulate not the employment of a certain number of coolies but the importation from outside the Peninsula of a stated number of coolies.

Mr. Quartley seconds the proposal.

Mr. Ritchie also supports the motion which he thinks was very desirable.

Mr. Bennett says that as long as there was any restriction on emigration to this country such a proposal was obviously impossible. He also would like to know whether such a clause would not operate unfairly in the case of an estate wishing to employ its surplus labour by opening up new areas.

Mr. Tayler thinks that notice ought to have been given of such a proposal and that it was unwise to precipitate a decision at this meeting before everybody had had time to consider the question in all its bearings. He would therefore propose that the matter be placed on the agenda of the next meeting.

Mr. McCulloch agrees with this view and withdraws his motion accordingly for the time being.

Mr. Jeavons says that the present very serious shortage of Indian labour had been discussed at the Kuala Lumpur District Planters' Association's recent meeting who quite approved of the resolution recently passed by the Standing Committee of the Planters' Association of Malaya as incorporated in the Secretary's letter to the Controller of Labour of 13th December and he would propose that a similar motion be now adopted by the whole Association.

Mr. Harvey assures the meeting that the Standing Committee were fully alive to the seriousness of the labour position and they had initiated certain steps about which for the time being he could say nothing, but he felt sure that when they had a scheme to lay before them it would meet with the entire approval of the Association, but before he could say any more they had to await the result of certain representations which they had made to Government on the question.

Mr. Ritchie would like to second Mr. Jeavons' proposal if it could be made to extend to Chinese labour as well.

Mr. Brooke would like to make a personal explanation as to his reported reference to Mr. Aldworth at the recent meeting of the Ulu Selangor District Planters' Association when he was reported to have said that he wished to do away with Mr. Aldworth. He of course had not meant any personal reference at all but intended to say that they wished to do away with the Controller of Labour.

Mr. Jeavons then proposes and Mr. Ritchie seconds the following resolution, which is carried unanimously:

> "That this Association views with concern the present shortage of labour in this country and considers that all restrictions in respect of age and for passports in the case of Tamil labour be removed and that adequate shipping be provided to bring over at least 150,000 persons from India; and that the Controller of Labour be asked kindly to support this request and to enlist the High Commissioner's good offices with the Indian Government, and also in regard to the provision of shipping for Chinese labour."

Mr. Harvey says in connection with Indian labour as a side issue of what the Standing Committee were doing, the question of getting Indians to settle in this country had received their close attention. It was obvious that a policy of colonization of this country by Indian labour was worth investigation to put it at the lowest. Some parts of the country like Province Wellesley were quite successful in this respect but the rest of the Peninsula had apparently been so far unsuccessful in making this country a permanent home for Tamils. The present custom for Tamils was to

remain in this country for two years at the outside and then to return to India which was not a good system from any point of view. The Standing Committee therefore suggested that the Association should pay the expenses of a qualified person from India to come over here and to report to the Association on this aspect of the labour problem. The gentleman they intended to ask was Mr. C. F. Andrews who had been to this country on a short visit and he could say that he was a friend of this country and was fully in favour of Indians emigrating to this country. No harm could come from such a report and possibly a great deal of good. If there was anything wrong in their methods it was to everybody's advantage that that should be pointed out to them. He therefore on behalf of the Standing Committee would propose that Mr. C. F. Andrews be asked to visit this country on behalf of the Planters' Association of Malaya to make an exhaustive report on the conditions under which Indian labour lives here with a special view to reporting on the feasibility of a scheme of colonization; and that the Association vote a sum of $350 to defray his travelling expenses.

Mr. Mooijaart has much pleasure in seconding the proposal which is put to the meeting and carried unanimously.

5.—EXPORT DUTY.

The Secretary reports that since the adjournment of the last Federal Council, the High Commissioner had informed the Unofficial Members that the sliding scale had been re-introduced; that duty would continue to be calculated on the Singapore market price for f. a. q. rubber; that below 50 cents per lb. no duty would be payable, at 50 cents and under $1.50 per lb. the duty would be 2½ per cent. and at $1.50 per lb. and over 3 per cent.

6.—MEDICAL.

The Secretary reports that the Standing Committee had considered the Labour Code Amendment Bill which proposed to facilitate the taking over of estate hospitals by Government and he submits the following memorandum which they had prepared on the subject:

"MEMORANDUM ON LABOUR CODE AMENDMENT BILL OF 30th AUGUST, 1918.

"Kuala Lumpur,
"*22nd January, 1919.*

"I. The Standing Committee as instructed by the Association have carefully considered the above Bill and consider that the primary objection to it is that it confers dictatorial powers on the Controller of Labour and they feel strongly that before planters can agree to the Enactment it would be necessary to substitute a Rural Board for the Controller of Labour.

"They therefore recommend that the Government be asked to insert in section 207B (i) before the words 'Chief Secretary' the

words 'on application made by a Rural Board'; and also to provide a section for the constitution of Rural Boards as follows:

"A Rural Board shall be established for each State and the powers vested by the Bill in the Controller of Labour and/or the Medical Officer shall be vested in such Rural Boards, which shall have the power to take action at the joint instance of the Controller of Labour and the Senior Health Officer and/or of any estates or properties; that such a Rural Board consist of three Government officers, three planters elected by the Planting Associations of the State in question and of one private Medical Practitioner to be co-opted by the other members; always provided that for members financially interested in questions before the Board substitutes shall be co-opted to deal with the points in question.

"II. Arising out of the above the Standing Committee recommend in order to avoid misunderstanding that what in the Bill is called 'the Board' be now called 'Board of Management' in order to distinguish it from the Rural Boards.

"The Standing Committee also think it desirable to elucidate what 'Medical Officer' means in the Bill.

"III. As regards the section dealing with expropriation it does not appear clear whether the land utilized for a Government hospital is to become Government property, nor whether any compensation will be paid.

"Another point is that the amount of 'adjoining land' required is not fixed which may lead to cases of serious encroachment on an estate to the detriment of that individual estate though to the benefit of the group hospital which happens to be situated on that estate.

"IV. Section 207J of the Bill provides for the valuation of an existing hospital but the wording seems to imply that the Government will have the power to deduct from the actual value of the estate the difference between such actual and the theoretical value which the hospital should have.

"The same section also provides for the taking over of existing hospitals on credit.

"The Standing Committee consider that hospitals when taken over should be paid for in cash and that the amount paid should be based on the actual value of the hospital at the time.

"V. Section 207L provides that a rate not exceeding 50 cents an acre shall be imposed to defray the cost of the hospital, diet for patients and all other necessaries.

"The Standing Committee believe that such rate would in no way pay for the purposes aforesaid and therefore would like to know whether that section is inserted in order to induce estates to turn over their hospitals to the Government. If that is the case the Standing Committee consider that the Government should give an undertaking that the said maximum of 50 cents an acre will not be increased for say 21 years.

"No mention is made in the Bill as to the sources from which the deficit is to be met.

"By order,
"H. C. E. Zacharias,
"*Secretary.*"

Mr. HARVEY enquires whether the meeting agreed with the findings of the Standing Committee and if so whether the Secretary should be instructed to forward it to Government in reply to the Under Secretary's letter of 31st August last.

Mr. CUMMINS enquires whether the cost of operations was included under "necessaries" mentioned in section 207v of the Bill.

Mr. MCCULLOCH personally does not think that the Government would persist in pushing the Bill through. In any case the cess which Government proposed was so cheap that estates could well afford to pay extra for operations. It was really quite a minor point, and he proposes that the memorandum as submitted be forwarded to the Government as representing the views of the Association on this draft measure.

Mr. QUARTLEY suggests that it would be best to refer the memorandum back to Constituent Associations.

Mr. TAYLER observes that if they wrote to Government in the terms of Mr. McCulloch's proposal that would mean that they approved of the Enactment.

Mr. BROOKE agrees that this was so but that they only approved of the Enactment as amended by their memorandum. Once they had Rural Boards to consider cases they would be sure of a sympathetic hearing and they therefore need have no objection to the Enactment. He had much pleasure in seconding Mr. McCulloch's motion.

Mr. HARVEY agrees and does not think there was any need to send the memorandum back to Constituent Associations. The whole question had dragged on now for more than a year, and the Association had definitely charged the Standing Committee to prepare a memorandum which they had done now and there seemed to him no reason why it should be referred back again and the answer which the Government were waiting for yet further delayed.

Mr. RITCHIE says that even apart from other considerations they should give their whole-hearted approval to the memorandum because if the Government agreed to their recommendations, it would be a great step forward if only they could get Rural Boards constituted.

Mr. MCCULLOCH's motion is then put to the meeting and carried unanimously.

7.—RUBBER RESEARCH.

The SECRETARY submits the following correspondence:

"*4th December, 1918.*

"SIR,

"I have the honour to enclose for your information copy of transaction of Rubber Research Committee and to inform you that at the last meeting of this Association an amended scheme as

per copy attached was unanimously approved of and I was instructed to submit that His Excellency approve of this scheme and cause it to be adopted.

"I have, etc.,

"(Sd.) H. C. E. ZACHARIAS,
"*Secretary.*

"SECRETARY TO H. E. THE HIGH COMMISSIONER,
"FEDERATED MALAY STATES,
"SINGAPORE."

"HIGH COMMISSIONER'S OFFICE,
"KUALA LUMPUR,
"No. 2048/18. "*9th December, 1918.*

"SIR,

"I have the honour to acknowledge with thanks the receipt of your letter of the 4th instant with which you forward a copy of the transactions of the Rubber Research Committee, and to inform you that the report is under consideration.

"I have, etc.,

"(Sd.) W. G. MAXWELL,
"*Ag. Secretary to the High Commissioner*
"*for the Malay States.*

"THE SECRETARY,
"PLANTERS' ASSOCIATION OF MALAYA,
"KUALA LUMPUR."

"*4th December, 1918.*

"DEAR SIR,

"I thank you for your letter of 6th November, and regret that I was unable to see you before you left this country.

"A General Meeting of this Association was held on the 25th ultimo when the Research Scheme as finally formulated was unanimously adopted by the Association and I was instructed to forward same to His Excellency the High Commissioner with a request to approve of same.

"The meeting in discussing the scheme recognized the valuable work done by you in this connection and that the scheme was mainly due to your advice and to the hard work put in by you in this country. A hearty vote of thanks was subsequently passed and I was instructed to convey same to you, which I have great pleasure in doing herewith.

"Trusting that our joint proposals will soon be put into operation,

"Believe me, etc.,

"(Sd.) H. C. E. ZACHARIAS,
"*Secretary.*

"DR. E. J. BUTLER,
"IMPERIAL DEPARTMENT OF AGRICULTURE,
"PUSA,
"BENGAL."

"IMPERIAL DEPARTMENT OF AGRICULTURE
"IN INDIA,
"*Dated Pusa, Bihar, 20th Dec., 1918.*

"DEAR SIR,

"I thank you for your letter of 4th instant conveying to me a vote of thanks passed at the General Meeting of your Association held on the 25th November last.

"I can assure you that this action on the part of your Association is highly appreciated by me.

"The assistance which I received from the Planters' Association of Malaya, both collectively and from the individual members through whose abundant hospitality I was enabled to visit so many estates, was of the greatest value to me during the course of my enquiries. I wish to take this opportunity of expressing my warmest thanks to all concerned, as without their generous co-operation it would have been impossible for me to have carried through my work.

"I have, etc.,
"(Sd.) E. J. BUTLER,
"*Imperial Mycologist.*

"To
"THE SECRETARY,
"PLANTERS' ASSOCIATION OF MALAYA,
"KUALA LUMPUR,
"FEDERATED MALAY STATES."

8.—ROADS.

The SECRETARY reports that Mr. Kindersley at the last Federal Council Meeting had called the attention of Government to the bad state of the main roads and since then the Chief Secretary had replied that the subject had been given considerable attention, but the Government considered that on the whole the road system was a very good one and he hoped that when normal times again allowed the Department to be at its proper strength and material was available there would be fewer complaints.

Mr. HARVEY thinks that the whole matter was a question of labour and if they pressed this very much they might find that the Public Works Department would interfere seriously with their own labour supplies. Anyhow the Government had admitted that they were shorthanded at present.

Mr. BENNETT says it was clearly want of supervision which causes all the trouble.

Mr. JEAVONS says that the Kuala Lumpur District Planters' Association had had a long correspondence with the State Engineer and the Under Secretary but so far nothing tangible had resulted. He thinks a solution of the difficulty was to make the Public Works Department recruit their own labour.

Mr. N. H. DAKEYNE contends that the Department did that but not in sufficient numbers.

Mr. Bailey thinks the solution was to make the Public Works Department coolies work longer hours.

Mr. Ritchie agrees with Mr. Bennett that lack of supervision was really at the root of their troubles. There were fewer Europeans in the Department and he suggests that this was really a question for the Salaries Commission to consider.

Mr. Cumming corroborates that Public Works Department officers had too much office work.

Mr. McCulloch says he had replied to the list of questions sent to him by the Salaries Commission to the effect that he thought the Police and Public Works Department staffs had too much office work and that an insufficient number of men were available for their proper work outdoors.

9.—QUININE.

The Secretary submits the following letter:

"*4th December, 1918.*

"Sir,

"I have the honour to acknowledge receipt of your letter 4038 of 27th September.

"The question of quinine was further discussed at the last meeting of this Association when I was instructed to enquire what the present wholesale price of quinine in Java is.

"I should be glad if you could make official enquiries on the subject through His Majesty's Consul-General in Batavia.

"I have, etc.,

"(Sd.) H. C. E. Zacharias,

"*Secretary.*

"Under Secretary,

"Federated Malay States,

"Kuala Lumpur."

Mr. Harvey informs the meeting that he had been able recently to buy in Singapore quinine at $15 a pound.

Mr. Lewton-Brain says it had been decided to start growing cinchona in the Federated Malay States on two separate areas which had already been selected.

10.—TODDY.

The Secretary submits a memorandum by the Krian Licensing Board on the Estate Co-operative Toddy-shop System and the best methods of running toddy-shops.

Mr. Fisher says that whilst last year there had been 16 toddy-shops under the Klang Licensing Board, now there were none at all.

Mr. N. H. Darbyne enquires whether this Krian scheme was going to be enforced in Selangor.

Mr. Ferguson explains that the Krian scheme was a purely voluntary one and that the memorandum merely explains the system under which Government would allow estates to run their toddy-shops, if they so desired.

11.—STATISTICAL BUREAU.

The Secretary submits the following letter from the Rubber Producers' Association of Malaya:

"Singapore,
"*24th January, 1919.*

"Dear Sir,

"Under direction from the Standing Committee we send you, for your information, a copy of a letter we have addressed to the Chief Secretary to the Federated Malay States Government.

"Yours faithfully,

"(Sd.) Barker & Co., Ltd.,
"*Secretaries.*

"The Secretary,
"Planters' Association of Malaya,
"Kuala Lumpur."

"Singapore,
"*24th January, 1919.*

Rubber Producers' Association of Malaya
(incorporated).

"Sir,

"We are directed by the Standing Committee of this Association to enquire what steps are being taken in order to the establishment of a Statistical Bureau, which it would appear from references made at the Planters' Association of Malaya Meeting on 25th November last, your Government has under consideration.

"We are to state that this Association is strongly in favour of the establishment of such a Department and that, while it is entitled to give expression only to the views of those interested in the Rubber Industry, it is of opinion that this Department might with advantage include statistics of all branches of trade and commerce in British Malaya.

"We are further to point out that the usefulness of existing returns is largely vitiated by the fact that they are compiled separately for the Straits Settlements and Federated Malay States, so that export and import figures frequently overlap and that if full advantage is to be obtained from the establishment of such a Department it should be empowered to deal with statistics of the Straits Settlements as well as the Federated and non-Federated Malay States.

"We have addressed a similar letter to the Colonial Secretary, Straits Settlements.

"I have, etc.,

"(Sd.) W. LOWTHER-KEMP,
"*Managing Director.*

"THE CHIEF SECRETARY TO THE GOVERNMENT,
"KUALA LUMPUR."

The SECRETARY also reports that whilst Mr. Kindersley at the November Meeting of the Federal Council had been pleased to learn from the Chief Secretary that the Government fully approved the formation of a Statistical Department and also that no delay in its formation need take place, although no provision had been made for it in the Estimates, 1919: the Chief Secretary had since replied that he considered it desirable to await the arrival of the Trade Commissioner and to obtain his views as to the appointment of an officer.

Mr. RITCHIE thinks this matter was one of great urgency and sees no reason why the matter should be left over until the arrival of a Trade Commissioner.

12.—UNITED MALAYA COUNCIL.

The SECRETARY explains that this Council was going to present an address on the 6th proximo in Singapore when His Excellency the Governor would unveil a tablet on Raffles Statue. Subsequently they would hold a meeting on the 7th proximo to consider suggestions for a revision of the rules. As this Association had not yet appointed its delegates and there would be no time now to hold elections in time to have representatives at the two functions next week, the Standing Committee proposed that for the time being the delegates of the Planters' Association of Malaya to the United Malaya Council consist of the Chairman of each Constituent Association or of any substitute delegated by such Association. When the annual elections took place in April, delegates of course would be elected in the ordinary course of events.

Mr. HARVEY proposes the adoption of the Standing Committee's resolution.

Mr. FERGUSON seconds and the proposal is carried unanimously.

13.—FOOD CONTROL.

The SECRETARY submits the following correspondence:

"RESIDENT COUNCILLOR'S OFFICE,
"PENANG,
"*6th December, 1918.*

"No. War 3748/18.

"SIR,

"I have the honour to inform you that arrangements have been made with the Indian Government by which parboiled rice can be obtained from Rangoon.

"I would suggest that the managers of estates should be informed of this as in case they anticipate any difficulty as regards supplies before the new harvest, they may make arrangements to import the amount they require.

"Permits to import can be obtained on application from the Assistant Registrar of Imports and Exports, Penang.

"I have, etc.,

"(Sd.) W. C. MICHELL,
"*Resident Councillor.*

"H. C. E. ZACHARIAS, ESQ.,
"SECRETARY,
"THE PLANTERS' ASSOCIATION OF MALAYA,
"KUALA LUMPUR."

"CHAMBER OF COMMERCE,
"PENANG,
"*6th December, 1918.*

"PARBOILED RICE.

"DEAR SIR,

"We beg to inform you that this Chamber has been advised by the local Food Control Committee that arrangements have been made with the Government of India whereby 4,000 tons of parboiled rice have been allocated for the requirements of Malaya.

"2. Licences to import up to the quantity above mentioned may be obtained by dealers and/or consumers on application to the local Government.

"3. It is thought that the foregoing information may be of assistance to your Association at this time but we are instructed to draw your special attention to the fact that it will be necessary for those chiefly concerned, *i.e.*, Federated Malay States consumers, to make their own arrangements to ensure importation, etc.

"Yours faithfully,

"(Sd.) BROWN, PHILLIPS & STEWART,
"*Secretaries.*

"THE SECRETARY,
"PLANTERS' ASSOCIATION OF MALAYA,
"KUALA LUMPUR."

Mr. GOOCH says it was true that at present adequate steps had been taken to cope with the situation but it seemed to him that there was no guarantee that a precarious state of affairs would not recur six months hence. He would therefore propose that Government be asked whether any steps had been considered to safeguard the future supply of imported rice after the present harvest is exhausted.

Mr. McCulloch seconds the proposal.

Mr. Harvey observes that the appointments of men like Mr. James as Food Controller and of Mr. Hose as Controller of Food Production showed that the Government were really in earnest and meant to take up the whole question not merely for the time being but with a view to the future.

The motion is then put to the meeting and carried unanimously.

14.—AFTER-WAR EMPLOYMENT.

The Secretary reminds the meeting that he had sent out last November a circular in order to find out how many men there were connected with planting in this country for whom priority of demobilization was desirable. He had now obtained replies from a number of Constituent Associations and asks for further instructions.

Mr. Ritchie says that he had a letter lately from one of his assistants who was in the Indian Army Reserve of Officers to apply for his release. Subsequently he had a telegram to the effect that applications should be made direct to the Military Secretary in Delhi. He got the Resident of Negri Sembilan to support the application.

Mr. Jeavons relates that some time ago he wrote to his brother at home asking what arrangements he was making to get away after the war was over. He replied that he had been given six months' privilege leave to proceed to the Federated Malay States and in the meantime arrangements would be made for his demobilization when in Malaya.

Mr. Tayler understands that the General Officer Commanding the Forces had prepared a memorandum on the Priority of Release and he suggests that the Secretary ask the Chief Secretary for a copy of same.

Agreed to.

15.—NEXT MEETING.

The Secretary reports the receipt of a letter from the Chairman of the Johore Planters' Association inviting the Planters' Association of Malaya to hold a meeting at Johore Bahru on 26th March.

Mr. Ferguson thinks that it would be too great a tax on the time of the delegates if they had to attend a meeting in March and again one in April. He would therefore propose that the March meeting be cut out and that the next meeting be the Annual General Meeting in Kuala Lumpur on 30th April.

Mr. Gooch seconds the proposal, which is carried unanimously.

16.—CHAIRMAN.

Mr. Tayler wishes to propose that a hearty vote of thanks to Mr. Kindersley be recorded in their minutes for the nearly two years' work which he had done whilst in the chair.

Mr. McCulloch has much pleasure in seconding Mr. Tayler's proposal and would add that he regretted very much the occurrence which had caused Mr. Kindersley to resign.

Mr. Gooch supports the proposal, which is carried unanimously.

17.—GENERAL.

Mr. Jeavons gives notice that he wishes to have placed on the agenda of next meeting the questions of Telephones, Hired Cars, and Registration of Domestic Servants.

Mr. Harvey observes that the Kajang District Planters' Association had nominated Mr. Kennedy as next year's Chairman and that they had instructed their Secretary to ask District Associations for their support of that candidature. He would like to have the opinion of the meeting as to whether they considered canvassing appropriate. He personally deplored it and considered it detrimental to the best interests of the Association.

Mr. Cummins points out that his Association had merely acted on precedent, as two years ago they had similarly been approached and been asked to support the candidature of Mr. Kindersley.

Mr. McCulloch says that canvassing was clearly not against their rules but he quite agreed that it was most undesirable and he thinks this meeting ought to express its disapproval of such methods. Of course he had nothing whatever against the candidature of Mr. Kennedy but agreed with Mr. Harvey that canvassing was not the right thing for them to do.

The meeting then terminates at 1.15 p.m. with a vote of thanks to the Vice-Chairman.

H. C. E. Zacharias,
Secretary.

FEDERATED MALAY STATES.

Comparative Statement of Cultivated Rubber Exported, with Value and Duty Collected thereon, during the Years 1918 and 1919.

Destination.	Exported during January 1919.	Previously.	Total export to date, 1919.	Export during similar period of previous year.	Increase.	Decrease.	Value of rubber exported to date, 1919.	Value of rubber exported during similar period of previous year.	Duty collected to date, 1919.	Duty collected during similar period of previous year.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	$	$	$ c.	$ c.
Straits Settlements...	6,620.91	...	6,620.91	6,572.91	48.00	...	10,727,600	13,319,327		
United Kingdom ...	541.94	...	541.94	615.54	...	73.60	878,073	1,247,366		
Continent of Europe	...	...	...	...	...	...	...	...	480,619 33	631,891 35
Ceylon	...	...	...	105.33	...	105.33	...	213,444		
Other Countries ...	...	...	...	294.10	...	294.10	...	595,991		
Total ...	7,162.85	...	7,162.85	7,587.88	48.00	473.03	11,605,673	15,376,128	480,619 33	631,891 35

KUALA LUMPUR,
20th February, 1919.

E. BURNSIDE,
Acting Commissioner, Trade and Customs, F.M.S.

Abstract of Meteorological Readings in the various Districts of Malaya for the month of October, 1918.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kelantan, Kota Bahru	...	150.0	81.4	89.83	73.74	16.09	77.4	.860	74.7	80.	...	12.06	1.90
Pahang, Kuala Lipis	...	...	79.28	89.63	72.96	16.67	74.99	...	...	...	...	8.59	1.62
Johore, Johore Bahru	...	...	...	88.10	73.79	...	...	...	...	...	...	7.06	1.94
Singapore, Kandang Kerbau ...	29.829	164.0	83.2	86.6	74.7	11.9	78.1	.889	...	78.	Calm.	6.41	1.70
Malacca, Durian Daun ...	29.856	140.0	81.0	88.0	74.0	14.0	77.0	.904	...	83.	N.W.	12.56	2.20
Negri Sembilan, Seremban ...	...	146.9	79.3	86.7	71.4	15.3	76.7	.849	72.5	86.7	S.W.	8.14	1.85
„ Kuala Pilah ...	...	140.5	80.0	89.2	69.1	20.1	77.1	.889	75.1	85.1	...	10.40	2.13
„ Port Dickson...	...	112.9	81.6	86.4	73.1	13.3	75.9	.847	74.5	81.5	...	6.92	1.33
Selangor, Kuala Lumpur ...	29.807	141.4	81.0	88.0	72.6	15.4	75.8	.806	72.6	77.	Calm.	17.79	3.51
„ Klang	...	...	80.0	84.7	74.0	10.7	76.3	...	...	...	...	11.51	3.15
„ Kuala Selangor ...	...	...	...	87.9	74.5	13.4	...	...	...	...	...	7.65	1.44
„ Rawang	...	...	...	91.6	...	...	...	...	...	...	...	10.54	1.47
Perak, Telok Anson	...	...	80.42	90.0	70.0	20.0	77.29	.894	...	87.	...	12.71	1.96
„ Ipoh	...	...	81.39	93.0	69.0	24.0	76.49	.846	73.34	80.	...	15.83	4.25
„ Taiping	...	112.0	79.76	92.0	68.0	24.0	76.09	.851	...	85.	...	23.85	7.20
„ The Cottage	...	...	...	...	...	...	...	...	...	...	...	45.03	4.56
„ Parit Buntar	...	...	81.22	92.0	70.0	22.0	76.92	.869	...	82.	...	17.12	2.59
Penang, George Town	29.766	145.8	82.3	89.4	72.5	16.9	79.7	.940	72.9	85.3	N.W.	17.83	4.80
Kedah, Alor Star	...	...	...	...	...	...	...	...	...	...	...	10.14	2.15
Perlis, Kangar	...	...	...	87.26	73.81	13.45	...	...	...	...	...	14.38	2.21

Abstract of Meteorological Readings in the various Districts of Malaya for the month of November, 1918.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kelantan, Kota Bahru	...	140.0	78.8	87.50	74.33	13.16	74.6	.777	71.7	78.	...	23.76	3.84
Pahang, Kuala Lipis	...	...	80.09	90.43	72.63	17.8	75.18	...	...	...	...	12.27	3.67
Johore, Johore Bahru	...	...	...	87.58	73.15	...	...	...	...	...	...	9.52	1.82
Singapore, Kandang Kerbau ...	29.808	162.0	82.0	87.8	74.4	13.4	77.4	.876	...	80.	S.W.	5.63	1.33
Malacca, Durian Daun	29.849	130.0	80.0	87.0	74.0	13.0	77.0	.883	...	85.	N.E.	9.68	1.81
Negri Sembilan, Seremban ...	...	142.1	80.8	86.7	72.7	14.0	76.4	.855	74.5	78.7	N.W.	14.01	1.22
,, Kuala Pilah ...	...	139.7	80.8	89.0	69.1	19.9	77.6	.896	75.4	83.9	...	10.30	1.46
,, Port Dickson...	...	112.2	81.2	88.6	73.5	13.2	77.1	.854	74.4	80.7	...	11.33	2.49
Selangor, Kuala Lumpur ...	29.810	143.5	84.1	87.7	73.2	14.5	76.2	.824	73.1	78.	S.E.	11.44	2.16
,, Klang	...	...	79.2	88.9	74.1	9.8	75.7	...	...	...	...	12.98	2.38
,, Kuala Selangor ...	...	...	...	87.7	74.4	13.3	...	...	...	...	...	17.58	3.37
,, Rawang	...	...	...	92.0	...	...	...	...	...	...	...	10.16	1.58
Perak, Telok Anson	...	...	80.99	91.0	70.0	21.0	77.99	.916	...	87.	...	19.99	5.82
,, Ipoh	...	...	80.60	92.0	72.0	20.0	76.51	.860	73.69	82.	...	18.74	3.66
,, Taiping	...	115.0	79.96	92.0	69.0	23.0	76.56	.869	...	87.	...	25.47	3.77
,, The Cottage	...	...	...	...	...	...	...	...	...	...	...	34.60	4.09
,, Parit Buntar	...	...	81.20	93.0	70.0	23.0	77.42	.892	...	85.	...	12.40	2.55
Penang, Georgetown	29.783	145.3	82.4	89.3	83.2	6.1	78.3	.904	69.8	89.4	N.W.	17.83	3.11
Kedah, Alor Star	...	...	...	...	...	...	...	...	...	...	...	10.02	2.12
Perlis, Kangar	...	...	...	86.30	73.17	13.13	...	...	...	...	...	8.10	1.70

Abstract of Meteorological Readings in the various Districts of Malaya for the month of December, 1918.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kelantan, Kota Bahru	...	143.0	77.6	85.93	72.74	13.19	74.8	.807	72.8	85.	...	30.82	4.65
Pahang, Kuala Lipis	...	...	80.16	89.45	72.48	16.65	76.33	...	...	...	...	8.30	1.55
Johore, Johore Bahru	...	...	...	88.27	73.30	...	...	...	...	...	...	12.18	3.86
Singapore, Kandang Kerbau ...	29.823	162.0	82.2	88.2	74.4	13.2	78.0	.898	...	82.	N.E.	9.33	3.38
Malacca, Durian Daun ...	29.864	129.0	82.0	87.0	74.0	13.0	77.0	.895	...	82.	N.E.	5.07	1.90
Negri Sembilan, Seremban ...	...	147.8	80.2	88.3	72.6	15.7	77.0	.868	75.2	83.3	S.W.	10.78	1.60
,, Kuala Pilah ...	...	140.7	80.1	88.3	69.1	19.2	76.8	.867	74.6	83.7	...	13.04	2.36
,, Port Dickson...	...	124.5	81.8	87.0	74.0	13.0	77.5	.867	75.3	80.4	...	5.89	1.92
Selangor, Kuala Lumpur ...	29.834	144.7	80.7	88.3	73.0	15.3	76.6	.828	73.5	78.	Calm.	7.38	1.98
,, Klang	...	...	80.0	84.1	74.0	10.1	74.9	...	...	...	...	10.86	2.52
,, Kuala Selangor ...	...	...	...	88.3	74.3	14.0	...	...	...	...	...	4.15	1.22
,, Rawang	...	...	...	92.8	...	...	...	...	...	...	...	9.11	1.49
Perak, Telok Anson	...	...	80.51	91.0	70.0	21.0	77.65	.910	...	89.	...	16.25	3.26
,, Ipoh	...	...	81.06	92.0	70.0	22.0	76.28	.842	74.24	80.	...	14.17	2.04
,, Taiping	...	110.0	79.94	91.0	68.0	23.0	76.27	.857	...	85.	...	32.04	8.73
,, The Cottage	...	...	...	...	...	...	...	...	...	...	...	29.92	4.13
,, Parit Buntar	...	...	81.22	92.0	70.0	22.0	76.90	.869	...	82.	...	10.11	1.96
Penang, George Town	29.782	114.3	82.9	89.4	73.0	16.4	78.6	.938	69.3	82.9	N.W.	12.39	.63
Kedah, Alor Star	...	...	...	...	...	...	...	...	...	...	...	4.30	1.92
Perlis, Kangar	...	...	...	86.38	72.25	14.13	...	...	...	...	...	2.83	.89